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Original Communications.

*GENERAL CONSIDERATIONS ON THE DIETETIC TREATMENT OF DISEASES OF THE STOMACH AND INTESTINE.**

By Professor Dujardin-Beaumetz, Paris, France.

GENTLEMEN:—I am well aware that I am about to take up one of the most difficult topics connected with hygienic therapeutics, but such is its importance that you will permit me to dwell at some length on this subject of diet in diseases of the stomach. It may be affirmed that the majority of gastric affections are tributary to an exclusive treatment based on hygiene, and that in the therapy of these diseases pharmaceutical agents play only a secondary rôle.

To give method to what I have to say, I shall proceed after the following order: I shall begin by establishing the bases on which you may institute the dietetic regimen of diseases of the stomach, and this will be the theme of the present lecture. Then, in another lecture, I shall apply these general considerations to each of the stomach disorders in particular.

Two modes of procedure are at the disposal of the practitioner to guide him in the study of affections of the stomach,—the clin-

* Two lectures on Alimentary Therapeutics, delivered in the Cochin Hospital. Printed from advance sheets.

ical methods, properly so called, and the more strictly scientific methods, which are addressed at once to the stomach. The clinical methods were the only ones which we possessed till Kussmaul's discovery enabled us to study directly the gastric functions. They consist in the palpation and percussion of the stomachal region, in an attentive interrogation of the patient, and in an examination of the vomitus and dejecta. We thus used to obtain the only signs that could guide us in the diagnosis of gastric affections.

These signs, from the particular point of view of the functional working of the stomach, were, it must be admitted, of doubtful exactness. The patient can give you but very uncertain information concerning the precise duration of the stomachal digestion, and the repugnance which he often experiences for certain articles of food is especially a matter of habit and custom, or, it may be, of a particular idiosyncrasy. I once knew a patient who could not eat *veal kidney* without veritable symptoms of poisoning; others experience similar effects from eggs, and the list of cases of the kind might be considerably augmented.

Recall to your mind in this connection the modifications which pregnancy effects in the digestibility of certain alimentary substances, also the still stranger tolerance or intolerance which some nervous and hysterical persons manifest for certain articles of food, and you will agree with me that if the ordinary clinical processes are of use in the study of the way the stomach performs its functions, they lack precision.

Hence it is that we gladly welcome the more scientific methods which come to us from Germany, and of which Leube has been the most ardent and able expounder,—methods which consist in directly examining the mucous membrane of the stomach and its contents. All these processes are based on the employment of the stomach sound and explorers, and comprehend two distinct acts,—examination of the duration of digestion and examination of the gastric juice.

Let us commence with means used to ascertain the duration of the digestion. According to Leube, a healthy stomach ought in seven hours to have digested a plate of soup, a large slice of beefsteak, and a small wheaten loaf. The liquid of a lavage of the stomach, made after that lapse of time, ought to be absolutely clear, if the stomach is doing its work well. Kretschy makes a single reservation to the rule laid down by Leube,—during menstruation in the female the duration of the digestion may exceed seven hours.

But the examination of the gastric juice requires multiple and somewhat difficult processes, and we have here to study, on the one hand, the acidity of the gastric juice, and, on the other, its digestive power. Before entering on the consideration of these two questions, I must briefly point out the methods in use for obtaining gastric juice, and here again we shall have to study the two following points: how to extract gastric juice from the stomach, and how to make the mucous membrane of the stomach secrete this juice.

To obtain gastric juice from the stomach we have two methods,—that of the sound and the sponge method. If you wish to use the sound, the ordinary siphon-tube will answer the purpose, or, better still, the stomach-pump. I here place before you the one which I ordinarily use. This instrument, constructed by Collin, is very simple and very ingenious, and it suffices to turn the swivel which fixes the syringe to make it communicate either with the stomach or with an outward receptacle (Fig. 1).

FIG. 1.

Leube employs a soft rubber sound, six millimetres in diameter, the parietes of which are two millimetres thick, which is introduced into the gastric cavity, and by means of the stomach-pump, with which it is connected, the contents of the stomach are extracted.

Ewald makes use of a very handy method. He passes down into the stomach a soft rubber catheter scarcely larger than a good-sized urethral sound, and seventy centimetres long. This is introduced nearly the whole length, when he causes the patient to make an effort at vomiting, and at the moment that the liquid appears at the upper extremity of the sound, he seizes the latter with his fingers and quickly withdraws it from the stomach. He then blows into a wineglass the liquid which the catheter contains.

I have myself constructed a stomach-explorer, made for me by Galante, and which I here place before you (Fig. 2). It compre-

Fig. 2.

hends, as you see, a stomach-sound precisely similar to the tube of Debove, having a length of half a metre. In the interior of this tube is a little glass bulb, perforated at both ends, to whose lower extremity is attached a little rubber tube to put the bulb in communication with the mucous membrane of the stomach. The narrow upper extremity of the glass bulb is adapted to another rubber tube, which is much longer, and ends in a flask-shaped rubber ball similar to that which makes a part of an ordinary spray-producer. Finally, a stout string enables us easily to withdraw the glass reservoir. The mechanism of this apparatus is easily understood. You introduce the tube into the interior of the stomach, then, by means of the rubber ball, you exhaust the air in the glass bulb, which then admits gastric juice; then you withdraw the sound. When once the tube is out of the stomach, you remove the glass bulb by means of the string, and empty the gastric juice which you have extracted into a watch-glass by means of pressure made on the rubber ball. The apparatus is one of the most simple, and its introduction and removal are exceedingly easy, especially in individuals who are used to the stomach-tube.

In connection with the foregoing methods, consisting in stomach catheterization, the sponge method deserves mention, being a process which is very simple, and very much employed in Germany, and which we owe to Edinger. Little bits of sponges enveloped in gelatin are attached to the extremity of a long thread. The patient swallows the sponge while fasting. It is allowed to remain half an hour in the stomach, then is withdrawn by means of the thread, and the contents squeezed into a watch-glass for testing.

If you have not the prepared sponges, such as are made in Germany, you can very easily replace them by the following means. You take one of those gelatin-capsules, divided into two parts, encased the one in the other, and known under the name of *Lehuby capsules*. You place in the interior of the capsule a little sponge, to which is firmly attached a long silk thread, which is made to pass through the second part of the capsule, and the two hemispheres of the capsule are then firmly joined together, and are ready for use. The gelatin-capsule is soon dissolved in the stomach, and becomes impregnated with the gastric juice.

The sponge process is more painful than that of the sound. The object of resorting to this method is to do away with the necessity of the introduction of a tube into the interior of the stomach, but the deglutition of a sponge held by a thread, and which has to remain half an hour in the stomach, produces more nausea and vomiting than the sojourn of a sound. I have tried these sponges on a good many patients and on myself, and I have reason to abandon the method.

Now that you know the means employed to obtain gastric juice, I will tell you what you must do in order to provoke the secretion of this fluid. You know very well that the stomach, at the moment of your exploration, ought to be entirely empty, as the presence of food in that cavity considerably modifies the reactions of the gastric juice. You must, then, operate when your patient is fasting, and to stimulate the flow of gastric juice, you may employ three processes,—mechanical, chemical, and thermic.

The mechanical processes consist in irritating the gastric mucosa by a foreign body, as the point of a sound or a sponge. The chemical processes consist in the employment

of a solution of bicarbonate of sodium. You begin by washing out the stomach; then you introduce fifty cubic centimetres of a three per cent. solution of bicarbonate of sodium. At the end of a quarter of an hour you add a half-pint of warm water; then you siphon off (or remove by the pump) the contents of the stomach, to which you may apply the proper tests.

These two processes—mechanical and chemical—ought to be abandoned. The first, because it is uncertain; the second, because the bicarbonate of sodium modifies the reactions which you are seeking to elicit from the gastric contents. The thermic processes are now alone employed, and this is the *modus operandi:*

You introduce into the stomach by the siphon one hundred cubic centimetres of ice-water; then you wait ten minutes, and add three hundred cubic centimetres of water at the ordinary temperature. You siphon off the whole, and examine the liquid thus obtained. It is this "thermic" process which I am about to exemplify in the patient now before you. You have seen with what facility we have been able to accomplish our object, owing to the handy arrangement of the stomach-pump, which, by the rotation of the handle which fixes it, enables us to inject liquid into or withdraw it from the stomach.

We have, then, according to the formal directions of Leube, introduced one hundred cubic centimetres of ice-water into the stomach. We have waited ten minutes, then withdrawn the liquid, which I now place before you, and this it is which we shall now examine. We apply to this liquid two orders of tests,—the one intended to determine its digestive power, the other to ascertain the presence or absence of hydrochloric acid in the gastric juice.

I shall pass briefly over the first order of tests, which belong to the province of chemical researches, and consist in practising artificial digestion with the fluid extracted from the stomach. You take a certain quantity of this liquid; you add a little hydrochloric acid; then you introduce some coagulated albumen in the form of little cubes, whose weight you know. You put the whole in an oven heated to 40° C., and at the end of a certain time you estimate the quantity of albumen transformed into peptone; in a word, you perform an artificial digestion with this gastric fluid. This method, advised by Leube, can only be applied in exceptional cases, and is not to be commended as a practical method.

This is not so, however, with the processes put in usage to detect the presence of hydrochloric acid in the gastric juice. It is to Von den Velden that we are indebted for the most valuable contributions pertaining to this subject. After having insisted on the necessity of the presence of hydrochloric acid in the gastric juice to enable the stomachal digestion to go on, this clinical physiologist has laid down the law that when hydrochloric acid is wanting, its absence is due to a cancerous neoplasia in the stomach. There is, then, as you see, from the point of view of the diagnosis and prognosis of affections of the stomach, a considerable importance in determining the presence or absence of hydrochloric acid.

Three reagents have been proposed by Von den Velden,—methyl violet, which, under the influence of hydrochloric acid, passes from violet to blue; tropœoline, which changes from yellow to carmine-red; and fuchsine, which loses its red color altogether. A few words about these various reagents.

Tropœoline is a coloring substance which is obtained from coal-tar, and which owes its name to the fact that the colors which are derived from it resemble those of the nasturtium (*Tropœolum majus*). There are several kinds of tropœoline, which are designated under the names of tropœoline o, oo, ooo. It is the tropœoline oo of which you should make use. In France you can substitute for the German tropœoline a similar substance, to which is given the name *Poirier's orange*, from the name of the Poirier manufactory where are prepared the dye-stuffs derived from aniline; and as there are many shades of Poirier orange, it is the *orange No. 4* which corresponds to the tropœoline oo. You will make with the tropœoline oo, or the Poirier orange No. 4, a one per cent. solution.

As for fuchsine, a test solution is made of 2 or 3 centigrammes per 1000; but this reagent ought not to be employed for the three following reasons: first, because it is not a very sensitive test; second, because the decoloration is slow in being produced; lastly, because it is always difficult for the eye to decide if the decoloration is more or less complete. There remain, then, the two processes which are less open to objection,—that of methyl violet and of tropœoline.

In using the methyl violet test, you take two test-tubes. You place in these two tubes fifty cubic centimetres of distilled water, in which you deposit two drops of a two per cent. solution of methyl violet. Then you let

fall, drop by drop, in one of the tubes the liquid resulting from the lavage of the stomach, while in the other tube you drop an equal quantity of pure water.

I here show you this test, and you see how delicate it is, and while one of the tubes remains violet, the liquid in the other has turned quite blue. This test enables us to detect as small a proportion of hydrochloric acid as 1.5 per 1000.

The tropœoline test is even more delicate, and it presents the great advantage that lactic acid gives a much more gradual change of color. This is the mode of proceeding:

You take two watch-glasses of equal capacity, which you place on white paper, or on a square of white porcelain. Into one of these watch-glasses you insert by means of a pipette a given quantity of the liquid from the stomach, previously filtered. Into the other you introduce an equal quantity of water; then you let fall by means of a dropper into the two watch-glasses an equal number of drops of the solutions of tropœoline oo, or of the Poirier orange No. 4 (the one per cent. solution). It is easy for you to see how bright is the change of color, and while the contents of one of the watch-glasses keep their yellow hue, the other takes on a very marked carmine-red tint. To these tests Uffelman has added still two other processes; the one is based on the modification which the coloring-matters of wine undergo under the influence of hydrochloric acid. Uffelman practises this test in the following way. He takes one cubic centimetre of young Bordeaux wine, and adds three cubic centimetres of alcohol and glycerin. He thus obtains an almost complete decoloration, and it takes the merest trace of hydrochloric acid to give a red color to the mixture.

The other reagent proposed by Uffelman consists of a two per cent. solution of phenic acid, to which is added one drop of liquor ferri perchloridi. You thus obtain a blue-colored liquid. If to this solution you add a little hydrochloric acid, the color disappears. If you introduce lactic acid, the liquid becomes yellowish; if butyric, it becomes milky.

Uffelman's tests are less employed than those of Von den Velden, and the latter are certainly the most practical. It now remains to determine the diagnostic value of these tests.

In France these researches have been received with some degree of scorn, and few clinicians have undertaken to repeat these experiments of the German physicians, preferring still to follow the traditional methods. I think that there is little justification for this scorn, for if the anamnestic signs and symptoms furnished by the patient himself are capable of guiding us in our diagnosis, it is silly to reject methods which may in a certain measure confirm our diagnosis. The absence of free hydrochloric acid in the stomach is an important sign. I am well aware that this acid has been found to be absent in other diseases besides cancer, and Uffelman and Schillhart have proved this to be sometimes the case in dilatation of the stomach and in certain fevers, but the evidence is sufficient almost to warrant us in excluding all idea of cancer of the stomach when hydrochloric acid has been proved to be present in the gastric juice, and the interesting observation of Roose where this acid continued to be present in the gastric secretion till the death of the patient, which happened from cancer of the pylorus, is altogether exceptional.*

I have then entered with alacrity on the path marked out by our *confrères* of Germany. It is a line of investigation which they are pursuing with success, every day perfecting their methods. Thus it is that Ewald has pushed farther than any one else the inquiry at what moment in the digestive process the different acids of the stomach make their appearance. He has been led to admit three digestive periods. In the first, which lasts from ten to thirty minutes, lactic acid is found in the stomach. In the second, both hydrochloric and lactic acids are found. In the third, there is free hydrochloric acid, and this is noted one hour after the ingestion of food. Hence, Ewald advises that in the diagnosis of stomach affections one should always take due account of the four following circumstances: 1. Of the energy of the acid reaction; 2. Of the presence or absence of free acid; 3. Of the nature of this acid; 4. Of its digestive power on albuminoid substances and carbohydrates.

Before finishing these general considerations, I must say a few words concerning the general line of treatment employed in Germany, and in particular by Leube, in stomach affections.

Leube's therapeutic system is based on the employment of lavage of the stomach, and on this physiological axiom, that at the end of

* Roose, "Cancer of the Pylorus, with Persistence of Hydrochloric Acid in the Gastric Juice till the Death of the Patient" (*Revue Méd. de Louvain*, January, 1886, p. 20).

seven hours the stomach ought to be entirely rid of the food of the previous meal.

Leube has also established four modes of dieting, or, as we would say, dietary regimens, to which I shall briefly allude, borrowing from the excellent thesis of my pupil, Deschamps, on "Gastric Therapeutics in Germany."*

The first regimen consists of broth of meat-juice, of milk, and of eggs, soft-boiled and raw. These, according to Leube, are the most digestible of all foods. I call your attention to the order in which I have enumerated them. This order is, according to Leube, that of their digestibility.

As for drinks, nothing should be taken but pure water, or water slightly charged with carbonic acid; this regimen is suitable for beginning the treatment of chronic catarrh of the stomach.

In the second regimen we find (and here, too, in the order of their digestibility) boiled calves' brains and boiled thymus, boiled chicken, boiled pigeon, and you may add milk porridge, made with tapioca and whipped eggs, and calves' feet.

In the third regimen you will supplement these foods by very rare beefsteak and raw bacon. Leube dwells particularly on the mode of preparation of beefsteak. He directs to take a slice from the rump; this must be well pounded and then scraped with a spoon till the pulp is all scraped out; cook the pulp rapidly with fresh butter.

The fourth regimen comprehends a great number of alimentary substances, such as roast pigeon, venison, partridge, rare-done roast beef (to be eaten preferably cold), roast veal, and macaroni. Here for the first time wine is permitted, but in very small quantity. Vegetables in moderation, a very little salad, and still less of those stewed fruits which the Germans are always in the habit of serving with roast beef.

Such are the dietetic rules followed in Germany for the cure of affections of the stomach.

Now that you know on what basis are founded the dietetics of diseases of the stomach, we may study the regimen proper of each of these affections. This is what I shall now do.

We have already seen on what scientific basis we may establish the dietetics of the stomach. We will now apply these general considerations to the affections of the stomach in particular, beginning with cancer.

Cancer of the stomach has not, properly speaking, any special alimentary hygiene, and according to the seat, the variety of the morbid growth, the more or less rapid march of the affection, the symptoms and treatment are variable. But what you ought specially to keep in mind is that it is quite possible in the case of cancers of the stomach of wide extent to preserve the almost complete integrity of the digestive functions, and in a recent communication to the Society of the Hospitals, I have reported several cases which have passed under your own observation.†

You remember that man who lately occupied No. 17 ward, Beau; he was profoundly cachectic, and had in the region of the stomach a tumor of whose nature we were not much in doubt. This patient received, at his own solicitation, every day a salad of hard-boiled eggs, and for a month he made of this indigestible food his only sustenance; he died, and the autopsy fully confirmed our diagnosis, disclosing the existence of a spreading cancer, which had involved almost the whole of the stomach.

You also remember the female patient who entered our service for incessant vomiting and severe pain in the region of the stomach. Thanks to lavage, the functions of that viscus were restored to such a degree that the patient was able for a year to resume her ordinary diet. She entered anew our service, and suddenly succumbed. At the autopsy we found a perforation of the stomach in the centre of a cancerous degeneration. The annals of medicine abound in facts of this kind, and it may be affirmed that almost complete integrity (at least in appearance) of the functions of the stomach may coexist with the most advanced stages of the evolution of carcinomatous affections of this organ.

Here, then, you should allow yourself to be guided by the desires of your patient, while insisting at the same time that he shall take his food in a thoroughly boiled or pulpified state, and make choice of vegetable and starchy foods rather than such as are azotized and fatty. We base the exclusion of these latter aliments on the fact that the gastric juice, as I have already told you, in cases of cancer of the stomach, in losing its hydrochloric acid, loses its digestive properties on albuminoid matters.

If the rules of dietetics are uncertain in cancer, it is not so in the treatment of ulcer

* Bull. Gén. de Thér., 1886, t. cx. p. 70.

† Dujardin-Beaumetz, "On the Prognosis of Cancer of the Stomach." (*Bull. et Mem. de la Soc. des Hôpitaux*, 3d series, p. 129)

of the stomach; and Cruveilhier has won for himself lasting renown by having been the first to describe the malady and to find the remedy. This remedy, as you know, is milk diet, carried out in all its rigorousness; on this the life of the patient depends, for if he deviates from this regimen mortal hemorrhages may ensue.

Debove, to neutralize the digestive action of the gastric juice on the mucous membrane proper of the stomach, and to prevent all digestive operations in that cavity, recommends to give from 30 to 40 grammes a day of bicarbonate of sodium to the patient. I believe that such doses are not without harmful effects, and approve of the practice of Lucca, of Naples, who gives his patients milk made alkaline by lime-water.

It is only gradually, remember, that you should return to the ordinary diet, beginning with the starchy articles of food and going on to meat under its most digestible form,—that of meat-powder.

Milk, and an exclusive milk diet, is also the most active curative means in chronic catarrh of the stomach,—a disease which is almost always developed under the influence of alcoholic excesses. In this gastritis of the drunkard you observe two stages: in the first, there is at the outset exaggeration of the acid secretions of the stomach, producing pyrosis and cardialgia; in the second, there is cessation of the secretion of the gastric juice and production of mucus; this is the period of *pituitous catarrh*. In both periods you should employ no other dietetic regimen but milk, taking care always to add to the milk some alkaline water or bicarbonate of sodium.

As the sudden abandonment of all alcoholic stimulants often induces in these patients trembling and grave nervous disorders, you may in the first periods of chronic gastritis employ with advantage those fermented milks —kefyr or galazyme—of which I have spoken while on the subject of complete aliments; then you may gradually return to the ordinary diet, taking for your basis the different regimens which Leube has established for the cure of stomach affections.

But for many years, if not for a whole lifetime, the patient ought to abstain from every kind of alcoholic beverage, and drink nothing with meals but milk. This is a requirement very difficult of execution in the case of our laboring classes; hence you will continually see these patients, after having got well at the hospital, come back again for treatment by reason of having resumed their habits of intemperance. Never was anything more true than the common saying about the drunkard's oath (made only to be broken). I come now to the alimentary hygiene of gastrectasia.

Dilatation of the stomach, since Bouchard's notable researches thereon, has played a preponderant rôle in the pathology of gastric diseases. It deserves, then, to arrest our attention for a few minutes while we consider the dietetic treatment of this malady.

Struck by the fact that substances introduced into the stomach sojourn there an abnormally long time, and give rise by such sojourn to a characteristic swashing sound (*bruit de clapotement*), it has been deemed most rational to employ a dry diet in this affection, and to this system of cure has been applied the name of *xerophagia*. Vaunted anciently by Hippocrates, by Petronius, by Asclepiades, by Ettmüller, and more recently by Chomel, as the most efficacious treatment for what the latter improperly called *the dyspepsia of liquids*, this dry diet regimen has found an earnest advocate in our friend and colleague, Huchard. He recommends that the patient shall drink only a small tumblerful (8 to 12 ounces) at each meal, and none between meals; that he shall discard all foods that contain much water, and take no soups unless they are made very thick. He forbids fruits, and advises roast meats, eggs, and vegetables.

But it is to Bouchard that we are indebted for the most precise rules as to the dietetics of dilatation of the stomach. You will find in the remarkable thesis of my excellent interne, Dr. Paul Le Gendre, complete details as to Bouchard's regimen, and taking that as our standard authority, we will examine successively the drinks and foods of patients in gastrectasia.

As for drinks, Bouchard allows only 375 grammes (or about 12 fluidounces) with the breakfast and dinner, and none between meals. All beverages should be avoided which have a tendency to ferment; red wines should be interdicted, and the patient allowed only the table mineral waters, or water containing one-third or one-fourth part of beer or white wine, or a teaspoonful of brandy. It must be insisted on that the patient shall not drink between meals.

As for foods, all fatty substances must be abandoned; the patient must be allowed only bread crust or toast, the interval between repasts must be as long as possible, and there should be at least nine hours between the two

meals, breakfast and dinner, and fifteen hours between dinner and breakfast.

In my own practice I pursue a somewhat different course, and these are the rules which I apply to the treatment of gastrectasia. I divide the victims of this affection into two great classes, those who have diarrhœa and those who are constipated.

For the first I order a purely vegetable diet, —starchy foods, vegetables, and fruits. The amylaceous substances ought to be ingested in a thoroughly cooked condition; the vegetables should be very tender and well done, and the fruits stewed. I absolutely suppress meat and eggs. For a drink, I order Bavarian or Pilsen beer, or liquid malt. I insist upon a long interval between meals, and limit the drinks to ten fluidounces at each meal.

I add to this purely vegetable regimen the employment of carbon-bisulphide water as an antiseptic. This solution, of which I have already spoken in my "New Medications," renders me great service. The formula is as follows:

℞ Pure sulphide of carbon, f℥vi;
Essence of peppermint, gtt. l;
Water, f℥xiii.

Mix in a flask having the capacity of five hundred cubic centimetres, shake, and let settle. Use the clear supernatal solution, and renew the water as fast as you pour off from the flask for medicinal use.

I give daily from four to eight tablespoonfuls of this solution at meal-time and between meals. Each dose is taken with half a glass of milk or beer.

In the case of patients with dilated stomachs, who are constipated, I adopt the treatment of Bouchard,—that is to say, I permit roast meats. I order toasted bread and fruits, and especially peaches and grapes. I add light saline purgatives, such as, in particular, the natural mineral waters.

In both classes of patients hydrotherapy renders us great service. As for lavage of the stomach, it is indicated whenever the dilatation is considerable.

In rigorously submitting your patients to this system of diet, you will considerably ameliorate the state of their stomachs, and you will relieve most of the symptoms due to the gastrectasis, without, however, much modifying the distention of the gastric ventricle.

The alimentary regimen of dyspeptics is very difficult to establish. This word dyspepsia is destined gradually to disappear from nosology, and be replaced by the name of the disease of which the dyspepsia is the symptom; but for the present the term may be accepted for what is generally understood by it.

From the exclusive point of view of dietetics, I divide dyspepsias into three groups,—dyspepsia by excess of gastric juice secretion, dyspepsia by deficiency of secretion, and dyspepsia with sympathetic troubles.

For the first, you will order a purely vegetable diet, composed of bread, vegetables, and fruits. For drink, you will order milk, and you will sometimes allow beer, but never wine.

For dyspeptics with deficiency of secretion of gastric juice, meat and soups are, in my opinion, the best peptogenous agents. You will then order meat, but in a very assimilable form,—that is to say, in the form of powder or pulp. It is here that the meat-choppers and pulpifiers will render you great service. But it is necessary to be very careful about the quantity of meat which you order, and proportion it exactly to the digestive power of the patient whom you are treating. You may prescribe milk, which, by its lactic acid, augments the digestive power of the stomach. You can make use also of the mixture, vaunted by Herzen, of broth and milk. As wine and alcohol augment the acidity of the gastric juice, you will authorize wine, or water to which a little brandy is added. In this dyspepsia by deficiency of gastric juice, the peptones may render you some service when the patient can tolerate them.

For dyspeptics with sympathetic troubles, such as gastric vertigo, you should diminish all the excitations which result from the irritation of the mucous membrane of the stomach, and you will be most likely to do this by making your patient a vegetarian,—*i.e.*, by subjecting him to a regimen of bread, fruits, legumes, and vegetables, and giving him milk for a drink.

As you see, gentlemen, I attribute a considerable importance to a strictly vegetable diet in a great number of diseases of the stomach. Allow me, then, to state the principal points in this dietetic treatment.

In regard to bread, I order the crust rather than the crumb, or, better still, when the patient has good teeth, bread well toasted.

As for amylaceous foods, I recommend mashed potatoes, pea-soup, and bean porridge, Indian-meal puddings, and hominy, oatmeal porridge, and oatmeal cakes, barley gruel, sago, farina, arrow-root, macaroni, etc., in puddings, adapting the regimen to the condition of the patient, whether fat or lean.

Vegetables must before eaten be boiled to a mash; salads, legumes, spinach, sorrel, green beans, etc., must be cooked till quite tender.

Fruits should be stewed or baked before being eaten, grapes alone being excepted. In this dietary I allow eggs, on condition that they be soft-boiled or eaten raw. For drinks, beer seems to me preferable to wine in a strictly vegetable regimen.

I shall now finish what I have to say on the subject by briefly alluding to the dietetic treatment of diseases of the intestine. I shall concern myself here only with constipation and diarrhœa, two diseases in which diet has a most happy influence. Let us begin with constipation.

Constipation is often tributary to an appropriate alimentary regimen, and it may in truth be said that to the constipated the diet treatment is worth more than the medicinal.

As a general rule, it will be enough simply to augment the quantity of the fæcal matters if you wish to obtain regular stools, and as the excreta are constituted by the waste products of digestion, and in particular by cellulose which escapes the action of the digestive juices, it is for the most part by giving foods containing cellulose in abundance, such as bran bread, green vegetables, salads, spinach, sorrel, tomatoes, etc., that you can by dietetic means promote alvine evacuations. Recall to mind in this connection the singular remark of Voit, who affirms that by examining the fæcal matters deposited along the roads one may judge of the richness of a country. In places where the peasants eat meat, the fæces are hard; where, on the contrary, the food is of a purely vegetable kind, they are soft, and resemble cow-dung.

To these herbaceous substances, to these green vegetables, you may add certain articles of diet which, in constipation, possess curative properties. Thus, gingerbread eaten in large quantity is very generally laxative; fruits, and especially grapes, have this quality in a high degree. In the grape-cure, diarrhœa is one of the effects which is reckoned upon with certainty; melons, oranges, and lemons are used for the same purpose. Baked apples, especially when cooked with molasses, have loosening properties.

But there are two substances which have been especially vaunted in the treatment of constipation,—white mustard-seed and linseed-meal. Didier was the great advocate of white mustard-seed. This laxative agent, which was once very much in vogue, now seems to have gone out of fashion. If it had the advantage of often determining stools by its presence, it also, in more than one instance, was the cause of intestinal occlusion by the accumulation of these seeds in the intestine.

Flaxseed-meal is a good means for overcoming constipation when taken in the way which I prescribe. You macerate a tablespoonful of the ground seeds in a gill of water, steep an hour, and swallow the whole at meal-time. By all these little means you may succeed in maintaining regularity of the stools, though some obstinate cases resist them altogether. I come now to the dietetic treatment of diarrhœa.

From a dietetic point of view, we should distinguish abdominal fluxes determined by affections of the small intestine from those due to affections of the large intestine. It is especially with reference to the first that diet renders us important service. It will hardly be disputed that in chronic diarrhœas an appropriate dietary regimen is the *sine qua non*. This regimen is altogether based on the employment of the four following alimentary substances: milk, raw meat, peptones, and meat-powders.

Milk occupies the first place in the dietetics of abdominal fluxes, and it is by the milk diet rigorously carried out that you will obtain the mastery of these affections. I know, in fact, of but one form of chronic diarrhœa that is rebellious to this treatment, as it is in fact to all other treatments. I refer to tuberculous diarrhœa. I have said *rigorously carried out*, for infractions of this exclusive regimen perpetuate the diarrhœa instead of curing it, and we often see in our troops who return from the far East the sad consequences of such infractions of the milk diet.

The patient, finding himself a little better, and tired of milk, abandons this regimen, to go back to it again as soon as the disease increases in intensity; the diarrhœa is perpetuated, and the patient eventually succumbs. First, then, an exclusive milk diet; then raw meat and meat-powders. I much prefer the meat-powders to the raw meat, but it is necessary to proceed with extreme caution, and proportion the quantities of these azotized aliments to the state of the intestine.

Bazile Ferris preferred the peptones to raw meat and meat-powder, giving them along with the milk diet. You may at times use these peptones with benefit; then you may, little by little, increase the daily fare of your patient, being guided by your knowledge of the digestibility of the articles of food which you order.

Just as laxative properties have been ascribed to certain aliments, so, also, others have been regarded as constipating. In this connection I may mention quinces, and substances that contain tannin, such as artichokes. White of egg has also been utilized in these cases. All these means are absolutely secondary, and play a doubtful rôle in the cure of diarrhœa.

In the diarrhœa of infancy milk is still the remedial agent *par excellence* (the milk being suited to the age of the infant), and whenever you see in your little patients frequent greenish discharges, be persuaded that this diarrhœa results either from cold or the use of improper food. You well understand that you may augment the constipating properties of the milk by the addition of lime-water, which is very serviceable in such cases.

I shall finish this course of lectures on alimentary therapeutics by a final lecture on diet in fevers.

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*CRITICAL OBSERVATIONS AND EXPERIMENTAL STUDIES ON THE INFLUENCE OF PHARMACOLOGICAL AGENTS ON PERIPHERAL VESSELS.**

By Prof. R. Kobert.†

PART I.

IN the same way that Schmiedeberg and Bunge‡ studied on the excised kidney the formation of hippuric acid, and W. von Schroeder§ and W. Salomon‖ on the excised liver the formation of urea, may we also study the action of pharmacological agents on other organs thus kept artificially in functional activity.

This action may manifest itself in affecting the movements and variations in volume of the respective organ, in increasing or decreasing its secretion if it be a gland, and, finally, in altering the vascular calibre of arteries and veins.

Investigations relating to the *movements* of excised, or at least as well as possible isolated, organs have been instituted for physiological and pharmacological purposes on the iris of cold- and warm-blooded animals; on the urinary bladder and the œsophagus of the frog; on the wing-membrane of the bat; on the external ear of the rabbit; on the heart of reptiles, amphibious animals, and fish; on skeleton-muscles of dogs; and on the intestines, stomach, and uterus of various warm-blooded animals. Critically viewed, however, it is clear that the interpretation of phenomena thus observed cannot be otherwise but arbitrary until the technique of keeping an organ alive—in most cases this consists only in conducting a uniform current of adequate blood through the isolated organ—has been sufficiently studied and perfected. And this cannot, of course, be accomplished in a few isolated trials.

In view of the scanty experimental material in existence, I thought it appropriate to institute a more extensive series of experiments on the action of the most well-known pharmacological agents, for the sole purpose of studying the *alterations in the velocity of the blood-current.* I must remark that sufficiently numerous preceding experiments have demonstrated that my *modus operandi* of blood-transfusion insures the vitality of the respective organs for several hours, and procures a uniform sanguineous current.

The first trials with conduction of blood through surviving organs of warm-blooded animals appear to have been made by Alexander Schmidt,¶ under the direction of Ludwig in Leipzig. He conducted, with an approximately equal pressure, the blood of a dog through a dog's kidney placed in a heat-box, in order to study the generation of carbonic acid. These experiments, however, did not produce any results of pharmacological interest. The subsequent labors of P. Heyer,** and particularly of A. Mosso,†† on the other hand, which were likewise executed at the Leipzig Institute, have attained a high degree of perfection and claim our interest. The pharmacological results of these labors refer to nicotine, atropine, carbonic oxide, hydrate of chloral, and cyanide of potassium. Mosso continued, later on, these experiments in Italy, with various modifications; but these publications have never been seen by me.

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* A brief abstract of the results of this work has appeared in the *Tageblatt der Strassburger Naturforscherversammlung* (Strassburg, Trübner, 1885), p. 425.

† Chief of the Pharmacological Laboratory at Dorpat, Russia.

‡ *Virchow's Archiv*, vol. vi., 1877, p. 233.

§ Ibid., vol. xv., 1882, p. 387.

‖ Ibid., vol. xcvii., 1884, p. 149.

¶ "The Respiration within the Blood." Second Treatise. Proceedings of the Royal Saxon Society of Sciences of Leipzig; Mathem. Physic. Class, Proceedings of Meeting of November 9, 1867, p. 113.

** Expériences sur la Circulation du Sang dans les Organes isolés. Bruxelles, 1873.

†† "Some New Properties of Vascular Walls." Proceedings of the Royal Saxonian Society of Sciences, Leipzig, vol. xxvi., 1874, p. 305.

In 1877, J. Bernstein* advanced the following axiom, which held true also of the pharmacological science: Irritation of the sciatic nerve of a dog's thigh traversed by the blood of a (curarized) dog does not produce vascular contraction any more than during life, but provokes vascular dilatation. As Sadler† and Gaskell,‡ employing the same plan of blood-conduction, did not observe any alterations in the width of the current, Bernstein is inclined to attribute the vascular dilatation observed by him to the vessels of the skin. Later, in 1879, Filehne§ made some interesting experiments with the conduction of blood through a rabbit's ear. These experiments showed the action of nitrite of amyl to be of central origin. In 1880, Salvioli‖ demonstrated that by conducting blood through excised sections of the intestines certain phenomena of life could be accurately studied. He mentioned as such the absorption of peptone, the intestinal peristaltic movements, the increase of the ascending blood-current in poisoning with atropine and tincture of opium, and the decrease of the current in nicotine-poisoning. In the same manner, Albertoni¶ investigated later the action of cotoin on the intestines, and found that this agent increases the quantity of blood traversing the bowels. By blood-conduction through the posterior extremities of the dog, N. Rubenow** showed in 1880 that an infusion of adonis vernalis contracts temporarily the blood-vessels independently of the central nervous system.

In 1883, Abelés, experimenting with blood-conduction on excised kidneys, arrived at the conclusion that urea increases the blood-current in this organ. Of high value for the knowledge of results obtained by blood-conduction are also the experiments of M. von Frey†† and M. Gruber, in which the technique has reached the highest degree of perfection. In these painstaking works (which appeared after the conclusion of my pertinent researches) it was also shown that during the conduction the blood becomes essentially altered and ultimately unfit for use.

These are the most important data which have been recorded in regard to experiments on surviving organs of warm-blooded animals and the influence of pharmacological agents on such organs. The few serviceable experiments instituted with blood-conduction on *cold-blooded animals*, especially on frogs and turtles, will be referred to below. They are, however, of secondary importance, and are only of value when viewed as experiments parallel to those instituted on warm-blooded animals. The following are the two principal objections which must be urged against these experiments: 1. In no instance was there but a single organ traversed by the blood, but invariably the entire body, excepting the heart; hence it was impossible to tell which organ had caused the increase and decrease of the traversing current observed by the experimenter. 2. The medium of conduction used was in nearly every instance a solution of chloride of sodium, which was, besides, often mixed with blood foreign to the animal. Subjected to such a treatment the vascular walls, which in this connection play of course the most essential rôle, rapidly underwent pathological changes or even lost their vital energy. Although the defects of these procedures have been openly exposed by Glax and Klemensiewicz‡‡ in 1882, such researches are nevertheless constantly cited as embodying a scientific testimony. The mentioned experimenters showed that frogs treated in the manner indicated became invariably œdematous, even when by opening the auricles the flowing off of the traversing liquid had been greatly favored and the pressure employed was an exceedingly low one. The velocity of the off-flowing liquid decreases, of course, simultaneously with the formation of the œdema, provided the pressure of the incoming liquid remains uniform. To avert these drawbacks two procedures in particular have been proposed. The first is that of Sidney Ringer§§ and H. G. Beyer,‖‖ and consists in substituting for the solution of chloride of sodium a mixture of 100 c.c. of a seventy-five per cent. solution of chloride of sodium + 5 c.c. of a solution of chloride of

* *Pflüger's Archiv*, vol. xv., 1877, p. 575; *vide* also Lépine, Compt. Rend. de la Soc. de Biol., 1876, 4 Mars.

† Proc. of the Royal Sax. Soc. of Sciences; Mathem. Physic. Class, 1869, p. 189.

‡ Ibid., 1876, p. 45.

§ *Du Bois-Reymond's Archiv*, 1879, p. 385.

‖ Ibid., 1880, Supplem., p. 95.

¶ Ibid., vol. xvii., 1883, p. 291.

** "The Physiological and Therapeutic Action of Adonis Vernalis upon the Circulation." Inaug. Dissert. Petersburg, 1880; *vide* also *Schmidt's Jahrb.*, vol. cxcvii. p. 196, and *Deutsches Archiv für Klin. Med.*, vol. xxxiii., 1883, p. 262.

†† *Du Bois-Reymond's Archiv*, 1885, pp. 519 and 533.

‡‡ "Contributions to the Knowledge of Inflammation." First Communication. *Wiener Academ. Sitzungsb.*, vol. lxxxiv., section iii., 1882, p. 216.

§§ Journal of Physiology, vol. iii., 1883, p. 39.

‖‖ "The Influence of Cocaine, Atropine, and Caffeine on the Heart and Blood-Vessels," *Amer. Journ. of the Med. Sciences*, No. 179, 1885, p. 53.

calcium (1 to 390) + 2.5 c.c. of five per cent. solution of bicarbonate of sodium + 0.75 c.c. of a one per cent. solution of chlorate of potassium. This substitution is in many instances to be regarded as a decided improvement. (The results obtained with this solution differ, however, from those obtained with blood, as I shall show in the second part of my paper.)

The second plan proposed for the stated purpose was the employment of an artificial heart.

This substitution has two advantages,—first, the circulation was made to closely resemble the natural state, and then the otherwise inevitable thrombosis and subsequent formation of fibrin, resulting from settling (sinking) blood-corpuscles, was largely prevented. This insertion of an artificial heart has been proposed by L. T. Stevens and F. S. Lee.* Independently of these authors, I also made use of an intermittent pressure in various experiments upon frogs, in which I employed Ewald's† respiration apparatus.

On microscopic inspection of sections of the mesentery, or the web of frog, transfused in the manner indicated, pulsation could be made out even in the smallest vessels, and was seen to closely resemble the natural act, and to prevent the sinking of blood-corpuscles to a certain extent. Such pressure-intermissions imitative of cardiac action are, as M. Gruber‡ has lately shown, also of extraordinary value for the transfusion of organs of warm-blooded animals. This observer found that in transfusions without an artificial heart the pressure is to be gradually increased, if the current is intended to be kept up,—a precaution wholly unnecessary when an artificial heart is inserted.

As to the technique of my experiments on warm-blooded animals, I invariably used blood and organs of the same species of animals which was experimented upon. The principal animals of experimentation were dogs, rabbits, sheep, calves, hogs, and horses, and the principal organs the kidney, the spleen, the liver, the lower extremities, the entire posterior part, the intestines, and the uterus. Dogs and rabbits (in Dorpat also calves) were always killed immediately before the experiment; the other animals were killed in the slaughter-house, and the respective organs, together with the blood, were brought into the Pharmacological Institute, and used at once. By special provision, the animal temperature of these organs was kept up as well as possible. Diluted § or strange blood was never used, as I soon found that the latter showed a toxic action. This statement I feel called upon to emphasize in opposition to Salvioli, who employed strange blood mixed with a seventy per cent. solution of chloride of sodium. The organ was enclosed in a heat-box, having a glass cover, the temperature being retained constant at 38° C. The blood had previously been warmed by a similar process. A febrile rise of temperature—39.5° C. and more—is to be carefully guarded against as a certain source of disturbance, due probably to the contraction of the walls of the larger arteries, as observed by Roy and Grünhagen. The arterialization was effected by shaking the blood, and thus mixing it with air.

The concomitant lowering of temperature of the blood was immaterial, as the proper temperature could be reached again before the blood re-entered the organ. The blood reservoir was a double one,—a smaller one for poisoned blood and a larger one (containing a litre) for normal blood. Both communicated above with an air-filled gasometer, the pressure of which was kept at a constant level by means of a Mariotte bottle. This pressure corresponded always to the pressure indicated by the animal during life. By means of a valve I was enabled to supplant the normal blood-current by a poisoned one, and *vice versa*, without interruption of the circulation or alteration of the pressure. Care was taken not to mix the blood flowing from the vein, during the poisoning or immediately after, with the normal current. These experiments were regarded as available only when the alteration in the velocity of the current produced by an introduced poison *disappeared again under the use of normal blood.* In order to render the latter at all feasible the poisoning lasted only ten minutes or less. In the various similar cases recorded in literature

* The action of intermittent pressure and of defibrinated blood upon the blood-vessels of the frog and the terrapin. "Studies from the Biological Laboratory of the Johns Hopkins University," vol. iii., 1884, No. 2, p. 101. (I am greatly indebted to the Johns Hopkins University for the sending of this paper.)

† Ewald and myself first proposed the use of valves for physiological experiments (*Pflüger's Arch.*, vol. xxxi., 1883, p. 167). This contrivance is undoubtedly a very convenient one, as the valves open spontaneously on the slightest excess of pressure, and still close absolutely tight.

‡ Loc. cit., p. 538.

§ I have detailed below some few successful experiments made with diluted blood on rabbits. The larger majority of these experiments failed, however.

we usually find an omission of the statement that the velocity of the current became normal again after the termination of the poisoning. This neglect detracts largely from the value of such experiments, especially when vascular contraction comes to be considered, as it is well known that at the death of an organ the velocity of the blood-current decreases for various reasons. In my experiments the velocity of the current remained almost constant during the first two hours; *i.e.*, became constant again even after repeated poisoning. It was necessary, however, to slowly raise the pressure five to ten millimetres during the stated time. In experiments which lasted four or more hours, the pressure had to be gradually raised fifteen to twenty millimetres in order to reach again the original velocity of the current.

Another point to be considered is the gradual thickening of blood when flowing from a vein into an open vessel, and when shaken up with air. This alteration I endeavored to eliminate by successive additions of small quantities of weakly alkaline solutions of chloride of sodium (physiological solutions).

As to the proportion between the poison employed and the blood, I used such quantities of the former as would be proportionate to the poisoning of the entire body. Substances being insufficient in this concentration were usually likewise also in doses two to five times as large, and have been designated in the charts as having no influence on the velocity of the current. I believe that the reader will have confidence in my experiment when he sees that a large number of substances were examined in which no alteration of the velocity of the current manifested itself. The occasionally instituted experiments with blood-transfusions, as found in literature, are, I repeat, of little value, for the reason that one doubts whether the experimenter has so far mastered the difficult pertinent technique as to procure a uniformity of the current, even when no toxic agents had been employed.

Another very important point in these researches is to avoid introducing into the blood extracts, greasy substances, strongly acid or strongly alkaline agents, as these alter the velocity of the current by themselves without any additional intoxication. For this reason, then, most of the experiments made with ergotine, extract of digitalis, tinctures, and infusions are without value.

It is well known that in these transfusion experiments the central organs of the nervous system die first. In my experiments, however, I succeeded, when transfusing posterior parts and keeping alive the lower portion of the spinal cord, in two and even sometimes in four hours, to elicit muscular tetanus in the lower extremities by means of strong interrupted currents. Likewise successful, in the second hour, was Bernstein's experiment,—*i.e.*, increase of the flowing-off quantity under irritation of the sciatic nerve with or without curare. The survival of the kidneys* used for most experiments was proven by the existence of renal pulsation, often very distinct in the second hour, but wholly absent in the third. In other organs this pulsation is less distinct or wholly wanting. In order to convince myself of the vitality of such organs, I used as reagent hydrate of chloral in such great dilution as to barely increase the circulation of fresh organs. If this reaction did not appear after a transfusion of two to three minutes, the organ was regarded as dead and was laid aside.

After the termination of the experiment I often used to examine a portion of the organ microscopically. If the poisoning had not been too intense, the microscopic structure appeared, even after two hours, well preserved, save some small hemorrhagic and œdematous defects.

As to the differential behavior of the single organs towards one and the same poison, we can summarily assert that, excepting the kidney and the liver, all organs react alike qualitatively and almost alike quantitatively. This fact advocates the assumption that the toxic effects obtained in these cases refer solely to the vascular walls and not to another origin, such as the specific tissues of the single organs. The exceptional position of the liver can in this manner be also satisfactorily explained, viz., by the extremely scanty development of muscular tissue in the portal vein. I therefore obtained appreciable results with transfusion, beginning in the hepatic artery, while the transfusion starting from the portal vein led, in most instances, to no results. In the case of the kidney, some few active diuretic agents only make an exception from the above stated rule by acting on this organ more intensely than on others. Of this deviation I shall in some later publication treat in a more detailed manner.

Proceeding now to the significance of the variations in the velocity of the off-flowing current, we find that these may be brought about in the following manner:

* The kidneys cannot well be electrified.

1. *Mechanically*, if the consistency of the blood is increased or decreased, or if the pressure under which the blood enters the organ varies, or, finally, if air-bubbles or clots circulate in the blood-channels. I have succeeded in maintaining the consistency of the current at a pretty constant level by aid of the previously mentioned gradual addition of a solution of chloride of sodium, as can be seen from the pretty identical results obtained at the beginning and end of several experiments, by actual counts of the blood-corpuscles, by determinations of hæmoglobin and dried blood-substance. Any great variations in the pressure of the blood were prevented by a sufficiently large Mariotte bottle. If one of the two blood-vessels was opened for the purpose of filling it and the pressure thus lowered, the blood always flowed in this period without any alteration of pressure from the other vessel into the organ. A neglect of this rule caused always great variations in the velocity of the current.

As to the disturbance of the current by clots and air-bubbles, I found that quite a number of experiments had to be thrown aside on account of these interferences. In this connection, the careful warming of the blood after its first passages is to be viewed as an important factor, as subsequent coagulations are always apt to form.

2. *Thermally*, as sensitive organs like the uterus show reactive alterations of their vascular calibre, even upon variations of the blood-temperature amounting to only a few tenths of a degree. In these cases a good thermostat is of great value, though, after having fully tested my own apparatus, I could usually get along without this instrument.

3. *Chemically*, as in such experiments various factors are apt to alter the chemical relations of the blood. Thus it is particularly difficult to maintain the arterial character of the afflowing (entering) current. I candidly confess that my success in this matter has always been limited to certain boundaries. For, even if the blood be poured into both reservoirs as well arterialized as possible, we still find the blood contained in the larger reservoir changing its nature on account of the constant consumption of oxygen, and this long before it is completely empty. On the other hand, Mosso and Ludwig have shown that variations in the percentages of oxygen and carbonic acid exert a definite influence on the blood-current. I had myself repeatedly the opportunity of confirming the above observation. Another factor which causes gradual changes in the chemical composition of the blood is the formation of acids, such as lactic acid* and carbaminic acid. I have, therefore, added from time to time some alkaline agent, usually Runge's† alkaline solution of chloride of sodium, with the view of thus counteracting to some extent the disturbing influence of acids upon the velocity of the current. Again, we sometimes observe the formation of methæmoglobin, especially when the blood, the temperature being too high, has dried up on the vascular walls. This formation of methæmoglobin appeared to occasionally act as a disturbing agent in the transfusion of the kidneys.

4. *By neuro-muscular action,—i.e.*, by the specific influence exerted on the vascular muscular tissue and on the *ganglionic nerve-apparatus* located in the latter. As there is considerable variance of opinion concerning these nervous structures, and as, on the other hand, they play a most prominent rôle in the proper interpretation and appreciation of all of my experiments, I beg to briefly recall such pertinent items as can be safely regarded as established from both the anatomical and the physiological point of view.

(To be continued in our next issue.)

PNEUMATO-THERAPY.

By Solomon Solis-Cohen, A.M., M.D.‡

By pneumato-therapy is meant the utilization in the treatment of disease, of those modifications in the performance of the functions of organic life, which are brought about by modifications of the physical condition of the atmosphere in which the patient is immersed, or of the air he breathes, or of both.

The atmosphere may be modified for therapeutic purposes in respect to its density, its temperature, or its humidity. It is of changes of density only—that is, of pressure phenomena—that I desire to speak this evening.

Changes of atmospheric pressure are used in medicine by either of two methods, which have been respectively termed, the absolute method and the differential method.

An absolute change of atmospheric press-

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* *Vide* pertinent observations of M. von Frey, *loc. cit.*, p. 562.

† *Zeitschrift für Physiologische Chemie*, 1884.

‡ Chief of Clinic Medical Out-Patient Department, Jefferson Medical College Hospital, Philadelphia. Read before Philadelphia County Medical Society, December 8, 1886.

ure, affects both and equally the respired and the surrounding atmosphere. A differential change affects one of these factors only, or both unequally. Differentiation may be made to (directly) affect inspiration only, or expiration only; or it may be made to affect both phases of respiration, equally or unequally, in the same or in opposing directions.

While it is true, that patients may by change of residence to a more or a less elevated region, be subjected to absolute change in atmospheric pressure, yet this is, after all, but one of the factors in climato-therapy, and a brief allusion to the fact is all that properly falls within the scope of the present paper.

The absolute method in pneumato-therapy is applied by means of apparatus termed pneumatic chambers; a number of which have been constructed and are in use at different points in Continental Europe, but I am not aware of any establishment of the kind in English-speaking countries. The first of these was made, after designs by Tabarie, in 1838. The literature of the subject, however, is much older,* Tabarie having made his first communication to the Academy of Sciences at Paris in 1832, and Jounod having presented his first paper in 1835; while even in the eighteenth century, the attention of naturalists had been directed to the effects of condensed air on animal and vegetable life. Tabarie's cabinet could be used only with compressed air. G. Lange modified the apparatus so that rarefied air might also be employed, and so that expiration, if so desired, might be made directly into the outer atmosphere. In this latter respect, we find the first attempt at differentiation. It was in Lange's cabinet that Von Vivenot prosecuted his valuable and laborious researches. Von Liebig designed for the Mack Brothers at Reichenhall a pneumatic chamber said to be the best in existence, while that of Simonoff at St. Petersburg, consisting of a stone chamber and two iron ones, is said to be the most elegant in its appointments. The patient, or a number of patients, having entered one of these appliances, the contained air is then gradually condensed or rarefied by means of a steam-pump; the pressure being gradually restored to the normal after a sitting of from half an hour to two hours or longer. Special appliances secure proper ventilation, and permit regulation of pressure, of temperature, etc. These chambers are very costly, and their use necessarily restricted to certain resorts. Hence, for a long while, various attempts have been made to construct cheaper and portable apparatus. The portable apparatus utilize the differential method,—that is to say, the air within the lungs is rendered different in pressure from the surrounding atmosphere.

Changes of intra-thoracic air-pressure can of course be obtained without any apparatus whatever. Thus, if, while nostrils and mouth are closed, forced expansion of the chest be made (Müller's experiment), the air within the lungs will be rarefied; and conversely, if, after a full inspiration, the glottis, or the mouth and nostrils, be closed, and an effort made to contract the chest (Valsalva's experiment), assisted, perhaps, by manual compression (Weber's experiment), the intra-pulmonary air will be condensed. A less degree of condensation may be caused by expiring through but partially-closed lips; and a simple contrivance based upon this principle—a narrow tube, with a ball-valve to resist expiration—produces the same effects as expiration into compressed air. It is obvious, however, that the effect of rarefaction can thus be obtained only during a prolongation of the inspiratory phase of the respiratory act, while compression can be brought about only by a baffled or impeded expiration. The respiratory rhythm is completely deranged, the mechanical force employed and developed remains an unknown and variable quantity, while the disturbance of circulation is usually out of all proportion to the therapeutic value of the expedients.

Resort to apparatus for furnishing a supply of condensed or rarefied air is therefore preferable. Simple matter as the construction of such apparatus should seem to be, it was not until 1870 that any practical device at all fulfilling the necessary conditions was made; and not until 1874 that a reliable apparatus was presented to the profession. To Hauke, of Vienna, belongs the credit of having made the first approach to a suitable instrument; and to Waldenburg, of Berlin, is due the honor of having constructed an apparatus which has served as the model of the best of subsequent ones, and of having placed pneumato-therapy upon a firm scientific basis, by patient and accurate physiological and clinical studies.†

* For historical and bibliographical details, see J. Solis-Cohen, "Inhalation: its Therapeutics and Practice," second edition, Philadelphia, 1876; Oertel, "Handbuch der Respiratorischen Therapie," Leipzig, 1882. English translation by J. Burney Yeo, London, 1885.

† "Die Pneumatische Behandlung der Respirations und Circulations Krankheiten," Berlin, 1875.

In the arrangement of apparatus for the therapeutic use of compressed and rarefied air, two desiderata must be secured with mathematical precision,—1. The pressure must be a known and controllable quantity; 2. It must be constant, or varied only at will. The physical principles involved, are identical with those involved in a study of the physiological effects of pneumato-therapy; depending upon the properties of the gaseous state of matter, the tendency of matter in whatever state to move in the direction of least resistance, and the fact that the effect of terrestrial gravity upon the atmosphere, is to subject everything upon the surface of the earth to a continuous pressure, which, measured at sea-level, is represented by the weight of a column of mercury 760 mm. (29.9 inches) high,—*i.e.*, in round numbers, fifteen pounds to the square inch.

Two classes of apparatus have been constructed for the utilization of differential pressure. In the one, the air is condensed or rarefied in a receptacle from which the patient inspires, or into which he expires; in the other, the patient is placed within a contrivance in which the air surrounding his body, or a portion of his body, may be condensed or rarefied, while he breathes the ordinary atmosphere. Instruments of both classes were first constructed by Hauke.

We will consider first the most useful class, that in which the patient remains outside the apparatus.

Pressure or rarefaction may be obtained on one of three plans, which may be termed the water-level plan, the gasometer plan, and the bellows plan. The water-level plan depends upon the fact that change of water-level, without entrance or exit of air, in a vessel containing both air and water, will alter the density of the air. This was the principle first adopted by Hauke, and subsequently by Stoerk. Apparatus constructed on this plan simply, are not reliable, and are inconstant. The bellows plan depends upon the fact that a receptacle, with extensible and collapsible walls, may be made by expansion of the cavity to rarefy the contained air, and by contraction to condense it. The lungs work in this manner. The best apparatus for pneumato-therapy constructed on this principle is that of Biedert; one of the simplest and cheapest that of B. Fraenkel. While they are said to have answered admirably, they evidently can easily become fouled if used for expiration, and the pressure does not remain constant. Biedert's is also troublesome to manage. The principle is simple, however, and means for its employment readily available. Thus, J. Solis-Cohen, in 1866,* used a kitchen bellows to administer inspirations of condensed air, and the same writer in 1880† highly recommended a simple expedient to secure compression, suggested by Dr. W. Y. Gadberry, of Yazoo City, Mississippi,—namely, the employment, after deep inspiration, of an ordinary rubber hand-ball to force an additional quantity of air into the lungs,—as being more useful than drugs in promoting expectoration.

The gasometer plan depends upon the fact that if a vessel open at bottom, and with an opening at top to admit air, which may be closed when desired,—being suspended over water in another vessel, freely communicating with the outer air,—be raised out of the water by a force sufficient to overcome gravity and atmospheric pressure, the air will rush into its interior; that if the cylinder be then closed, the contained air may be rarefied or condensed by adding or subtracting gravity, or its equivalent, to or from atmospheric pressure; and that the positive or negative pressure thus obtained is independent of the volume of air within the air-chamber, which will rise or fall within the water accordingly. Thus we have a ready means of obtaining any desired pressure and of maintaining it, whether we withdraw air by inspiration, or add air by expiration. This is the principle upon which Waldenburg's apparatus is constructed, and upon which depend the modifications of Schnitzler, Weil, Tobold, Finkler and Kochs, and others, all admirable instruments and thoroughly reliable. The best of these are expensive. The minor objections to all instruments of this class are that they are more or less cumbersome, are troublesome to manage, and are not continuously acting, the capacity of the cylinder being of course limited.

This latter objection has been overcome in various ways. Some have so combined two cylinders that one rises while the other falls, and *vice versa*, permitting the patient to use one or the other alternately, with but slight interruption to the process. Geigel and Mayr, whose instrument Oertel commends above all others, have combined a water-level instrument (water-engine bellows) with a gasometer-bell; a series of revolving buckets taking up or discharging a certain quantity

* Op. cit., p. 55.

† Trans. Med. Soc. of Penna., Phila., 1880.

of water to compress or rarefy the contained air, which passes into the bell. This instrument is very costly. The continuous action, which is its great merit, can be secured in a much simpler and cheaper manner, by combining a foot-bellows, such as is used by dentists, with a Waldenburg or other gasometer. This is practically the plan of the instrument which, with the assistance of Mr. Chas. Richardson, I devised in 1883, and which I have already described and exhibited to this society. Originally intended, only to furnish to patients a cheap and safe instrument for home use with compressed air, I have found it capable of modification in other directions; so that when Mr. Richardson has concluded some experiments which he has kindly undertaken to test the feasibility of plans submitted to him, I hope to be able to present to the society an improved instrument, but slightly advanced in cost, which may be used for all the purposes to which the more expensive instruments are applied. Scales and gauges for exact research, may of course be attached to this, as to any other apparatus. To all of the forms of apparatus mentioned, except the simple accordion of Fraenkel, attachments may be added for warming, chilling, drying, moistening, or medicating* the air. Whatever plan be adopted, separate instruments should be used for expiration and inspiration; or two cylinders or bells may be combined in one instrument, as in the "double ventilators" of Waldenburg, Weil, Schnitzler, and Geigel and Mayr. Each patient should have his own mask or mouth-piece.

In order to obtain condensation or rarefaction of the atmosphere surrounding the chest, or the body, of patients unable, or, as in the case of children, unwilling, to undergo treatment by methods requiring their more or less active co-operation, Hauke has devised two forms of apparatus. In one, the chest only is surrounded by an air-tight cuirass, the air between which and the thoracic walls is either condensed or rarefied, the patient respiring the ordinary atmosphere. In the other form, the trunk and limbs enter the apparatus, the face alone being free. A very elegant but more elaborate and expensive means of arriving at the same result, is the pneumatic cabinet devised by Mr. Ketchum, of Brooklyn, and introduced to the profession by Dr. H. F. Williams of that city. The patient sits in an air-tight cabinet, the air about him being condensed or rarefied, while he respires the ordinary air, which is conducted to his mouth from the outside, by tubing. The respired air is charged with sprays of certain substances.

Were it not for the undemonstrable and misleading claims put forth by the proprietors of this patented instrument, and the questionable propriety of the methods by which it has been placed upon the market, I might pass it with this simple allusion. But since certain claims of historical novelty have misled even so accurate a student as my friend Dr. Platt, of Lakewood, who has completely disproved claims of scientific novelty and unscientific mystery,† I cannot complete this portion of the present article without a plain-spoken denial of these claims. That the instrument is not new in mechanical principle—whatever novelty and merits it may have in mechanical details, from which I have no desire to detract—is proved by the simple reference to the pneumatic chamber of Lange, and the pneumatic cuirass and pneumatic tub of Hauke. That it is not new in therapeutic principle goes almost without saying; for since differentiation of intra-thoracic from extra-thoracic pressure is the sole object, of what moment can it be, whether this differentiation be obtained by raising the one, or by lowering the other? Until those who claim superior virtues for the pneumatic cabinet can prove that the difference between 29 and 30 is either greater or less than the difference between 30 and 31, they will scarcely find general acceptance of their proposition.‡

That the cabinet offers a convenient and elegant method of applying some of the well-known principles of pneumato-therapy, none can deny. Those who prefer it to other and simpler means of accomplishing the same end, are justly entitled to use and express the preference. I simply wish to place on record a flat denial of the assertions that there is any therapeutic novelty about it; or that anything whatever can be done with it, that cannot be done at least equally well, and, in some instances, better, with Waldenburg's, Schnitzler's, or Geigel and Mayr's instrument; or that

* My own usual practice is to pass the air through a Wolff bottle containing a volatile medicament, suspended or dissolved in water, or floating upon the surface of the water. Creasote, terebene, thymol, iodine, benzoin, and similar substances may be thus employed. There are many other ways of medicating the respired air, but this subject is not properly within present limits.

† *N. Y. Medical Journal*, Nov. 6 and 13, 1886.

‡ The questions as to penetration of sprays and vapors are not now under consideration. Dr. Platt's article will elucidate this matter.

the results obtained by its use are any better than those obtained for nearly fifty years in Europe, and for at least ten years in America, with the various methods of pneumatotherapy, which I have described this evening.

This will be made clearer as we now pass to the consideration of the mechanical effects of compressed and rarefied air upon circulation and respiration. I say mechanical effects, for these are calculable and measurable with mathematical exactitude. That there must result as well certain other effects, through the nervous system especially, hardly admits of doubt; but the evidence is not perfectly clear and uncontradicted, and the explanation of observed facts is yet involved in obscurity. Not so, however, with the effects due solely to pressure, which follow the same rules as pressure-effects outside the body.*

Let us first review briefly, the well-known mechanism of respiration and of circulation. When by the expansion of the thorax, the contained air is rarefied, the denser outer air tends inward; when the thorax contracts, it compresses the contained air, which tends outward to the now rarer atmosphere. The amount of normal differentiation is small, having been estimated, from observations made in cases of wounds of the trachea, at — 1 mm. Hg. during inspiration, and + 2 to 3 mm. Hg. during expiration. Forced inspiration, however, gives a negative pressure averaging 57 mm. Hg., while forced expiration gives a positive pressure averaging 87 mm. Hg.

The average volume of air which enters or leaves the chest during inspiration or expiration, *the tidal air*, is small, having been estimated at twenty cubic inches; but on forced inspiration this can be increased by one hundred and ten cubic inches of *complemental air;* while forced expiration can expel one hundred cubic inches additional, properly termed the *reserve air*, improperly, the *residual air;* leaving still in the chest one hundred cubic inches of *residual air* or *stationary air*. The term *residual air*, as used in this paper, refers to the latter quantity. The object of this movement of air, is to introduce into the blood O, and to remove from it CO_2. This is accomplished in the alveoli; the air of which is consequently continually richer in the latter gas, and poorer in the former, than the air of other portions of the lungs; there being by diffusion a gradual increase of one and diminution of the other, until we reach the trachea and larger bronchi, in which the air most nearly corresponds to the outer atmosphere. At each inspiration there is an absolute as well as a percentage gain of O and percentage loss of CO_2; at each expiration there is an absolute loss of both, without percentage change from the end of inspiration, except as effected by the gaseous movement within the alveoli. This movement is in part due to the relatively higher tension of O in the alveolar space, and of CO_2 in the blood, the former passing inward, the latter outward. The volume of O which can be absorbed by the blood is the same at all pressures, but as the weight of a given volume increases with its density, the weight of gas absorbed increases with the pressure. The combination of O with the hæmoglobin, and the liberation of CO_2 from the salts of the plasma, depend largely upon the partial pressure of these gases; association being favored by high partial pressure, dissociation by low partial pressure. Now, both tension and partial pressure, while necessarily depending upon actual pressure, also depend directly upon relative volume, other things being equal. Consequently, whatever tends to increase the relative volume and actual pressure of O in the alveoli, within certain limits, facilitates both its passage into the blood and its association with the hæmoglobin; and whatever tends to diminish the relative volume of CO_2 in the alveoli, within similar limits, facilitates its dissociation from the salts and its escape from the blood.

Whatever increases pulmonary ventilation—that is, the volume of air taken in and expelled during each act of respiration—manifestly increases the pulmonary supply of O, and diminishes the quantity of CO_2; and pulmonary ventilation will be facilitated in one respect by an increase in the negative pressure of inspiration, and in the other, by an increase in the positive pressure of expiration. The weight of O in any given volume of air, and consequently in any given volume of O absorbed into the liquid blood, is of course increased directly as the pressure. Any process that would, while increasing the weight of O absorbed, also increase the rapidity and volume of the pulmonary circulation, would thereby bring a greater number of corpuscles into contact with the greater

* For physiological data and references, see Landois's "Physiology," translated and edited by Stirling. For the physical principles, consult Ganot's or other standard works on "Physics." For elaborate studies, see Waldenburg's and Oertel's works cited. The latter gives full references to investigations up to the date of publication (1882).

number of atoms of O, and thus cause increased oxidation of hæmoglobin.

The elastic tissue of the lungs has a tendency to collapse, which is opposed by the contained air and by the movements of inspiration; creating a condition of elastic tension. The force thus developed has been estimated at 30 mm. Hg. at the end of inspiration, and at 6 mm. Hg. at the end of expiration, or in the dead subject. The elastic traction of the lungs is a principal factor in dilating the auricles when they relax after systole; and the blood-pressure in the auricles being then less than in the venæ cavæ and the pulmonary veins, the blood flows into the heart. When the ventricles contract, the pressure within the heart becoming greater than that within the pulmonary artery and the aorta, the blood flows into the pulmonic and aortic systems. As the elastic tension is greatest in inspiration, that movement facilitates distention and filling of the auricles; while at the same time the rarefaction of the intra-thoracic atmosphere, likewise favors dilatation of the heart, and the influx of blood into it and into the venæ cavæ. In expiration, the elastic traction ceases to oppose systole, and the compression favors the expulsion of blood from the heart, facilitating likewise the outflow from the aorta and its intra-thoracic branches. Inspiration thus favors circulation, especially through the pulmonic and venous channels; expiration, through the aorta and its subdivisions. An increase in the pressure of the air respired, beyond the limits of ordinary barometric changes, would increase the inspiratory effects due to traction, but somewhat diminish those due to the negative pressure; it would also slightly increase the expiratory effects of pressure, while introducing an increased opposition due to the heightened tension. Diminution of pressure would, of course, have the opposite effect. There is always a slightly less pressure upon the pulmonary veins than upon the pulmonary capillaries, thus permitting the ready inflow of blood through the pulmonary circulation.

We have assumed in this outline study of the relations between respiration and circulation, that the respired air is of the same density as the surrounding atmosphere, and that at the end of inspiration, and at the end of expiration, the pressure within the thorax becomes the same as that upon the periphery of the body; and this is the normal condition. Obviously, if this condition be altered, the circulation will be correspondingly affected. The blood will tend from the point of high pressure to the point of low pressure,—from the thorax, if the air therein be condensed—towards the thorax, if the contained air be rarefied. In Mueller's experiment, for example, the negative pressure of inspiration is maintained and increased throughout the act. This increases cardiac dilatation; more blood flows into the heart and into the lungs, much less blood is expelled from the left ventricle, so that heart and lungs are engorged and the aortic vessels comparatively empty. The pulse may disappear. The blood-pressure and arterial tension are at first diminished, the arterial tension rising afterwards from vasomotor reaction.

In Valsalva's experiment, there is maintenance and increase of the positive pressure of expiration. The cardiac chambers and thoracic vessels are compressed; no blood can enter the right auricle or venæ cavæ; the blood in the lungs rapidly passes into the left heart, thence into the aorta, and out of the chest. The lungs and heart contain little blood, the peripheral vessels are distended, with at first increase of blood-pressure and of arterial tension, which afterwards falls from vasomotor reaction. Notwithstanding the increased pressure, the pulse may be absent from the same cause,—lack of blood in the heart,—to which the absence of the cardiac sounds is attributed.

By the use of apparatus for inhaling compressed air, the negative pressure of inspiration may be converted, as the act proceeds, into a positive pressure—and conversely by making expiration into rarefied air, positive pressure becomes converted into negative. We have then, at first a heightening, afterwards a reversal, of the normal cardiac-respiratory reactions.

One other feature of the respiratory act remains to be noted. One of the forces which the muscles of inspiration have to overcome, and which assists expiration, is atmospheric pressure upon the thoracic walls. The muscular labor of inspiration may be diminished either by invoking the assistance of another force, or by diminishing the resistance to be overcome. The first method is secured by increasing the density of the inspired air over that of the surrounding atmosphere; the second, by diminishing the atmospheric pressure. Reversal of the conditions would impede the act. In a similar manner, expiration may, by pressure differentiation, be facilitated or impeded.

Having thus fully considered the principal conditions of our problem, we can briefly sum-

marize the observed effects of the therapeutic applications of compressed and rarefied air, with the indications for the employment of these agents.

First, as to *the absolute method*, the method of Tabarie. In this, it is to be remembered, there is a complete change of pressure, the patient respiring air of the same density as that in which he is immersed. The effects of the *compressed air-bath* are due both to the physical changes produced in the air itself by the degree of condensation employed (from one-fifth to three-sevenths of an atmosphere excess pressure, with gradual transitions), and to the increased pressure exercised both upon the interior of the thorax and upon the periphery.

Inspiration becomes easier, expiration being slower and more laborious. As a consequence, the respirations are reduced in frequency and increased in depth, and the mobility of the thorax is increased. These effects continuing after a return to ordinary conditions, the ultimate effect is a gain in vital capacity.

The dilatation of the heart is antagonized, but to a less degree than its contractions are aided; for the normal amount of inspiratory negative differentiation can be brought about by increased muscular effort. Arterial blood-pressure is, upon the whole, lowered, so that the pulse becomes smaller and slower; and the blood tends from the superficies, both respiratory and general, to the deeper parts, and to those vessels contained in cavities with rigid and firm walls. There is increased absorption of oxygen and increased tissue-change, therefore increased nutrition and increased excretion. Upon the nervous system the effects are sedative and soporific. Concerning pathological conditions, both pulmonary and cutaneous, it may be noted that hyperæmia is diminished and absorption of effusions and inflammatory new formations, mechanically favored by compression; exactly as a bandage favors the same results.

The therapeutic indications are found in chronic congestive and inflammatory conditions of the skin, acute and subacute inflammations of the air-passages, chronic bronchitis, pulmonary emphysema unaccompanied by cardiac lesion, bronchial asthma, whooping-cough, pleuritic effusions, and the various forms of pulmonary consumption (in which are included the chronic pneumonias and bronchopneumonias), unless contraindicated by the danger of absorption of septic products present in lungs or bronchi, by high daily fever, by softening or excavation of lung-tissue sufficient to give rise to danger of rupture or of hemorrhage, or by general tuberculosis. Its especial advantage is to prevent extensive lesion in predisposed subjects with incipient disease. It has also been found useful in anæmia and chlorosis, and in obesity. Some observers commend it in certain cardiac lesions; others prohibit it in all. In the absence of personal experience, I can simply express a theoretical leaning towards the more cautious view. Other contraindications are found in states of the brain, spinal cord, or abdominal viscera, in which an increased supply of blood would be prejudicial.

The action of *rarefied air* in the pneumatic chambers is generally likened to the effects produced by ascent of mountains or in balloons, but certain differences exist owing to variation of atmospheric conditions in the higher regions. The rarefied air-bath has not been extensively employed in therapeusis, and as the recommendations made are largely based upon theoretical considerations only, I shall abstain from repeating them.

The differential method of pneumato-therapy, is that which is most readily available, most manageable, and, on the whole, most beneficial. Of this I can speak with positiveness, the result of some five years' personal observations. It introduces a new element into our physiological observations,—namely, the possibility of facilitating or impeding the performance of both or either of the phases of respiration, together or alternately. It is, then, particularly applicable in the case of patients too weak to respire properly unaided, or in whom pathological conditions oppose one or the other, or both, of the phases of respiration, or in whom the normal respiratory rhythm has become perverted, whether from excess in one direction or from deficiency in the other. It also produces circulatory effects, due to the difference between intra-thoracic and extra-thoracic pressure,—that is, between the pressure upon the heart, pulmonic vessels, and intra-thoracic systemic veins and arteries on the one hand, and upon the peripheral vessels on the other hand.

Atmospheric pressure upon the surface of the body remaining unchanged, increase of pressure upon the pulmonary surface may be obtained,—1. By inspiration of compressed air. 2. By expiration into compressed air. Decrease of pressure upon the pulmonary surface may be obtained,—1. By inspiration of rarefied air. 2. By expiration into rarefied air.

These procedures may be so combined as to maintain the increase or decrease during

both phases of the respiratory act, or to allow of increase during one phase and decrease during the other. All of these combinations were recognized and described by Waldenburg.

Increased pressure facilitates inspiration and impedes expiration. Decreased pressure facilitates expiration and impedes inspiration.

The facilitation of inspiration or of expiration, or of both, is usually the object of treatment; hence *inspiration of compressed air, expiration into rarefied air*, and the combination of these procedures, are the methods most widely employed. Inspiration of compressed air with expiration into the same medium, which, as pointed out by Dr. Platt, is virtually the method of the pneumatic cabinet, is highly recommended by recent American observers. The effects of these various procedures will vary,—1. With the degree of pressure employed. 2. With the time during which the process is continued; and, therefore, at different periods during its progress. 3. With the amount of voluntary co-operation on the part of the patient. The rationale of these variations being readily understood, and their effect easily deducible from the physiological studies already made, it will only be necessary to give what may be called an average summary under each head. It may first be stated in a general way that the amount of excess or diminished pressure is small,—from one-eightieth to one-thirtieth of an atmosphere; much less then, than in the absolute method. The time varies from ten minutes to half an hour or longer, with interruptions. A period of absolute rest should precede, and another follow, each period of treatment.

Inspiration of Compressed Air.—The excess pressure employed varies from one-eightieth to one-thirtieth of an atmosphere (+ 9.5 to + 25 mm. Hg.). From fifteen to thirty respirations may be made continuously, and the process repeated after a rest of five or ten minutes. The patient, if able, should stand, and, when necessary, the physician may aid inspiration by pressing the shoulders backward, or assist expiration by compressing the chest. When it is desired to localize or locally increase the effect, the healthy side of the chest (*e. g.*) may be strapped, or its motion diminished by manual pressure or pressure against a wall, chair-back, or other suitable object.

The effects, which follow from considerations already detailed, are decrease of muscular exertion necessary for inspiration, dilatation of the alveoli beyond that attainable by voluntary effort; increase in the quantity and in the penetrating power of inspired air,—therefore reopening of air-cells disused from weakness, occluded by the products of secretion and desquamation, or agglutinated from similar causes, and increase in the volume and weight per volume of O brought to and absorbed by the blood; a greater area of blood surface being reached. The subsequent expiration is sometimes slightly retarded, but is deeper, the quantity of air exhaled and of CO_2 eliminated, being increased. Tidal and complemental air are thus increased, reserve air diminished; the first two quantities and a portion of the third quantity, being added to form what is now virtually an increased volume of tidal air, reaching two hundred cubic inches or even more. Diminished frequency of respiration, increased expansion, ventilation, and gaseous exchange, are therefore the immediate effects; increased vital capacity the ultimate and permanent result. The circulatory effects are those of heightened pressure,—namely, an augmented centrifugal tendency of the blood-current; increased force of the ventricular systole; quickening of the pulmonic circulation, bringing more blood, therefore more corpuscles, more hæmoglobin, in proportion to area, into contact with the increased quantity of O; filling of the systemic vessels, with rise of arterial blood-pressure; the pulse becoming at first more rapid, afterwards slower, full, and hard. The blood circulates more actively throughout the body, being richer not only in oxygen, but also in nutritive materials, for pressure upon the diaphragm, transmitted to the abdominal viscera, stimulates absorption of chyme; while heightened pressure and augmented volume of blood in the viscera tend to stimulate functional activity. Thus, increased oxidation and tissue-change stimulate appetite and improve nutrition. Passing to effects upon pathological states,—pulmonary hyperæmia is relieved; inflammatory products are absorbed; cough and expectoration are at first increased, from dislodgment of accumulated materials, afterwards diminished from relief to irritation and diminution of pathological secretions. Increased ingestion and assimilation repair pathological waste, and the increase in weight sometimes exceeds the previous record in good health. Sleep is promoted; night-sweating is often arrested; hæmoptysis is sometimes checked.

Expiration into compressed air impedes the act and requires greater muscular exertion.

If this be sufficient to overcome the obstruction, the amount of air expelled is increased; otherwise it becomes gradually diminished, and the subsequent inspirations are therefore rendered shallower. In other words, tidal air is at first increased, but soon diminished; residual air gradually encroaches upon reserve air, tidal air, and finally upon complemental air; the entire volume becoming practically stationary or residual. The excursions of the diaphragm and thoracic walls become less and less, but at the expense of the contraction, fixed expansion being finally maintained; and if the procedure be pushed to excess with too high a pressure, apnœa may result. Pulmonary ventilation is diminished, and gaseous exchange is retarded; the absorption of O by the hæmoglobin being, however, facilitated, although the excretion of CO_2 is diminished. The effect upon the circulation, is an exaggeration of that produced by inspiration of compressed air, being practically the same as in Valsalva's experiment—depletion of the lungs and heart; over-distention of the systemic vessels, especially the veins. The pulse may disappear from compression of the subclavian artery. Upon pathological conditions, the pressure effects are similar to those already detailed.

Continuous respiration of compressed air, therefore, greatly augments the distention of the thorax and of the lungs, maintaining the patency of the alveoli; and while it diminishes during treatment the volume of air exhaled, the result may nevertheless be properly stated as an increase in vital capacity. The ventilation of the lungs is diminished, but, on the whole, gaseous exchange appears to be slightly increased. There is constantly increasing interference with the dilatation of the heart, and an outward pressure replaces the normal thoracic aspiration of the blood, thus blocking the systemic veins, while at the same time the arteries are distended. Arterial tension, increased at first, soon falls, and the pulse becomes small, slow, and feeble.

Inspiration of rarefied air, which should be conducted against a very small negative pressure, rarely exceeding one-sixtieth of an atmosphere, increases the muscular effort necessary to produce expansion of the chest, and the volume of air needed to supply the proper weight of O. If the requisite effort can be made, there is increase in the elastic tension of the lungs and in the volume of tidal air. If it cannot be made, there is decrease in both these factors. The subsequent contraction of the chest is at first passively facilitated, afterwards impeded from the resistance of the denser outer air. The muscular effort of this phase is thus also increased, and the frequency of respiration, at first heightened by the excitement of impediment, is finally diminished. Ventilation and gaseous exchange are, on the whole, increased, vital capacity augmented, and the muscles of inspiration strengthened. The blood tends at first to leave the periphery and accumulate within the thorax; but, as there is more blood delivered to the left ventricle, and this can contract with sufficient force to overcome the higher peripheral pressure, the final result is a quickening of the circulation with an increase in the fulness, blood-pressure, and tension of the arteries.

Expiration into rarefied air, conducted with a negative pressure of from one-sixtieth to one-twenty-fourth of an atmosphere, facilitates the contraction of the thorax, exerting a moderate suction-force, and greatly increasing the amount of air expelled from the lungs; thus facilitating the collapse of distended air-vesicles. Subsequent inspirations are rendered easier and deeper; more O-bearing air enters the vesicles; ventilation and gaseous exchange are enormously increased; and the increase in vital capacity is very great. The circulatory effects are similar to those produced by inspiration of rarefied air, but more marked. They vary in different individuals, are evidently different in man and animals, and can be influenced by the manner of subsequent inspiration. While there are conflicting observations as to systemic blood-pressure, there is agreement as to the tendency to pulmonary congestion and the facilitation of cardiac diastole.

The effect of *inspiration of compressed air, with expiration into rarefied air*, is to increase the efficiency of both processes. The alternate expansion and contraction of the lung-tissue stimulates its elasticity. Pulmonary ventilation, both as to interchange of gases and expulsion of effete materials, is vastly augmented. The alternations of opposing circulatory effects relieve hyperæmia wherever present, increase the activity and penetrating power of the blood-current, and stimulate tissue-change and nutrition.

Inspiration of rarefied air, with expiration into compressed air, increases the muscular effort necessary to complete each act, prolongs the respirations, and retards expiration particularly. The alternating centripetal and centrifugal impetus increases the activity of circulation.

Inspiration of rarefied air, with expiration

into the same medium (continuous respiration of rarefied air), increases the muscular effort of inspiration, but hastens and facilitates expiration. The centripetal tendency of the blood is maintained during the entire act, and the heart's action is greatly diminished in force and increased in frequency, the general arterial pressure being much lowered.

THE THERAPY closely follows the physiological indications. The degree of usefulness of pneumatic expedients in any given instance will of course vary with the conditions of the case: and proper hygienic, dietetic, and medicinal measures must also be instituted. In pointing out the classes of cases in which pneumato-therapy is useful, I do not wish to be understood as claiming the method to be competent to cure in every instance.

Inspiration of compressed air, and *expiration into rarefied air*, are the expedients most generally employed, singly or in combination.

Inspiration of compressed air is of benefit in dyspnœa, of almost any origin; in laryngeal and tracheal stenosis; in chronic bronchitis; in chronic broncho-pneumonitis; in chronic broncho-pneumonitis verging on tuberculosis; in chronic desquamative pneumonitis; in chronic interstitial pneumonitis; in atelectasis; in chronic pleurisy with effusion; in the dry pleurisy of early phthisis; in phthisis at any stage short of general softening, with one or more large cavities, but particularly in the early stages, when deficient respiration, impaired circulation, anæmia, and malnutritive dyspepsia in a predisposed subject, suggest tuberculosis even in the absence of pronounced physical signs.*

The good results of this procedure in phthisis result not alone from the primary effects already alluded to,—the opening of disused or occluded air-cells, with increased vital capacity, increased pulmonary ventilation, increased activity of circulation, absorption of inflammatory products, relief of congestion,—but also secondarily from the increased appetite; relief of cough, with promotion of sleep; and the general stimulus to local and general nutrition, following the systematic pulmonary gymnastics necessitated. In simple anæmia, or chlorosis, without tubercular tendency, the same good effects may be obtained. In asthma, the inspiration of compressed air is also useful, but high pressures are necessary, and must be cautiously employed. I have succeeded in one case, that of a patient who was attacked in my consulting-room, in cutting short a paroxysm by the employment of a pressure of one-thirtieth of an atmosphere, steadily maintained for nearly fifteen seconds, the expiratory act being held for the time in abeyance. This expedient, which I believe overcomes spasm by a paralyzing effect upon the bronchial muscles, and by inducing fatigue of the diaphragm, was suggested by the experience of Dr. Monell,† who obtained relief in his own person by forced expiration, with his feet braced against the foot-board of his bed, prolonged pause, forced inspiration, pause, and so on. In asthma and emphysema, however, better results are usually obtainable from expiration into rarefied air. In hæmoptysis, good results have been reported from the inspiration of compressed air and its equivalent,—rarefaction of surrounding air in the Brooklyn pneumatic cabinet. Some authors, however, have considered a hemorrhagic tendency as a contraindication to the measure. My own experience leads me to the belief that where there is any weakness of the pulmonary vessels, or any peripheral lesion of hemorrhagic tendency, or where it is inadvisable to increase blood-pressure in the brain, or in the kidneys‡ or other abdominal viscera, the measure is dangerous. In two remarkable instances, elsewhere cited,§ I have, however, been forced to credit it with a tendency to the relief of pulmonary hemorrhage; and this seems to be due directly to the relief of the conditions antecedent to hemorrhage,—namely, pulmonary congestion,—with perhaps an exaggerated stasis at one spot, from mechanical obstructions affecting that portion of the circulatory apparatus chiefly. Inspiration of compressed air is also recommended in mitral insufficiency, and in stenosis and insufficiency of the aortic valves. It is theoretically indicated in dilated heart, and with caution in lipocardiac asthma. I have had no experience with it in any cardiac lesion.

Expiration into rarefied air should be combined with the inspirations of compressed air, where it is desired to increase circulatory activity and gaseous exchange, or to get rid of

* It may be remarked here that evidences of pulmonary impairment, indistinguishable by the ordinary methods of physical exploration of the chest, may sometimes be detected during inhalation of compressed air,—a fact first published, so far as I am aware, by Dr. J. Solis-Cohen. *Vide N. Y. Med. Jour.*, October 18, 1884.

† *N. Y. Med. Record*, August 15, 1866. Cited by J. Solis-Cohen, *op. cit.*

‡ In one of my cases, albuminuria developed during treatment. This may have been merely a coincidence, but at the time I considered it more.

§ *Phila. Med. Times*, February 6, 1886, p. 362.

accumulating and decomposing matters in the interior of the respiratory viscus. *Expiration into compressed air* should be combined with the inspirations of compressed air, when it is desired to relieve congestion, or to stimulate absorption, or when increase of vital capacity is the principal object. Alternation of the combinations may be necessary in some instances.

Expiration into compressed air is recommended in cases of deficient normal expiration, as a means of strengthening the respiratory muscles.

Expiration into rarefied air is of signal advantage in emphysema, and in asthma dependent upon emphysema. It is of some advantage in spasmodic asthma, of less advantage in bronchitic asthma, though of value in all, and in the latter variety may be usefully combined with inspiration of compressed air. *Inspiration of rarefied air* is at times a better combination in emphysema.

Inspiration of rarefied air may also be employed where it is desired to strengthen the muscles of inspiration by increased voluntary exercise, as in cases of contracted thorax in the earlier stages of phthisis, and in convalescence after pleurisy.

That *forced voluntary respiration*, however useful in suitable cases, cannot replace pneumatic treatment by the differential method in cases where the latter is indicated, is evident from the mere statement that it does not produce differential effects; as well as from the fact that many patients are at first incapable of the necessary muscular exertion. As an adjunct or supplement to the differential treatment, or as a means of keeping up the good effects, it often serves excellently.

Pneumato-therapy, steadily growing in favor as the number of physicians resorting to it increases, bids fair to assume at last its proper position among the resources of medical art. It can only be damaged, not benefited, by a tendency to indulge in extravagant claims and reckless assertions. There is nothing mysterious about it,—no miracle, no witchcraft. It has its applications and its limitations, and these are exact and capable of determination, almost with mathematical precision. In practice, the benefits to be derived from it will depend upon its artistic employment,—as the result upon a canvas depends not on the chemical nature of the pigments, but upon the skill with which they are laid on.

As with all other therapeutic devices, including the administration of drugs, the more clearly we appreciate the pathological conditions present, and the more comprehensive and accurate our knowledge of the powers and limitations of the agent employed, the more skilfully we can adjust the action of the remedy to the requirements of the disease. The first essential, however, is to get rid of the notion that there is anything mysterious in the process, or that it is not governed by the same unalterable laws that affect all other things under the sun, and from which the sun himself is not exempt,—those laws more inexorable than the laws of the Medes and Persians, in that they were not decreed at the whim of man, and cannot be overturned even by rebels against the Legislator.

A CASE OF BASILAR MENINGITIS.

By W. G. Winner, M.D., Wilmington, Del.

A. W., the child whose illness I am about to describe, a boy about 3 years of age, was born of healthy parents, and no hereditary tendency to any disease existed, unless it might be that in one of its parents, whose father died of a hemorrhage from the lungs. This boy was the third child in the family, the other two being 4 and 5 years of age respectively, and all of them were nursed from the bottle. The oldest child and this one had been very hearty throughout their entire infancy, but the second child was inclined to be a little delicate. Six months prior to the beginning of the child's present illness he had a furuncular eruption on the face and scalp, which yielded to appropriate treatment, lasting only for a period of about three weeks, and was caused, it was thought, by overeating, as he was allowed, in addition to the milk, which he still took from the bottle, to partake of the diet prepared for the family, eating heartily of meats and vegetables.

Recovering from this, he enjoyed good health, appeared to be of a rugged constitution, and, with the exception of being slow in learning to talk, seemed to be a bright child for his age, quick to see and to act.

On January 7, 1886, about ten o'clock in the morning, while sitting in his little express-wagon, he suddenly fell over backwards, and was picked up in an unconscious condition, attended with general convulsive movements of the whole body, remaining in this condition for about twenty minutes. On recovering from the convulsion he seemed to be in a dazed and stupid condition, which gradually

wore off during the day, until towards evening, when he appeared to be almost as lively as usual.

The treatment given him for this convulsion was a hot mustard-bath, the inhalation of ammonia, a mustard draught to the stomach, and when he commenced to revive small doses of bromide of potassium were given.

On January 8, in the afternoon, a few minutes after waking from his afternoon nap, he had another attack, similar in character to the first; also one on the 9th, occurring at the same time of day; likewise one on the 11th, 12th, and 15th. A thorough examination had been made to ascertain the cause of these convulsions. The fall from his little express-wagon at the time he had the first convulsion was thought to be merely a result of the convulsive seizure, as it seemed impossible for him to have received any serious injury from a fall of not more than eight or ten inches, and no mark of any kind could be found. After the second convulsion the child was noticed to pick at his nose and to bore into the ear. These symptoms, together with the suddenness of these convulsive attacks, caused a suspicion of the existence of worms as a probable cause of his trouble. One or two thread-worms were found on pressing apart the nates, but neither the injections used nor the medicine given by the mouth caused the expulsion of any worms, or, if any were expelled, they escaped the notice of those who examined the stools. As the child had been placed upon a liquid diet, and the measures used had failed to throw any light upon the case, the bromide of potassium, which had been discontinued after the second convulsion, was again given.

From January 15 to January 20 no convulsion occurred, but on the afternoon of January 20 one occurred, and was followed by two more on the morning of January 21.

By this time other symptoms were manifested, viz., constipation, which was slight at first, was now becoming more marked; there were also light convulsive movements or jerkings, during which the child would throw the hands up to the head, and give a moan or cry as if in severe pain. A slight stiffness of muscles of neck was observed on the 22d, and slight enlargement of the cervical lymphatic glands. The stiffness of the muscles noticed on the 22d became more marked on the 23d.

As these symptoms indicated a trouble of a very serious nature, and rendered the prognosis very unfavorable, a consultation was held with Dr. H. C. Wood. It was then decided to continue the diet of milk, with light broths, and a little arrow-root starch or tapioca, and to place the child upon a combination of bromides, viz., bromide of potassium, grs. x; bromide of lithium and bromide of sodium, āā grs. v, daily, in divided doses. The iodide of potassium, 5 grains daily, was also given.

On January 23 the child's condition seemed to be getting worse. He was irritable, appetite poor, and the light convulsive attacks were numerous. The temperature, which was normal in the morning, showed an elevation in the evening of about one degree and a half, and a correspondingly quickened pulse-rate.

On the 24th a blister was placed on the back of neck, his appetite was a little better, and he rested fairly well at night, the temperature being but slightly elevated. An expression of dulness, which had developed about the 20th, was to-day very marked, and the muscles of neck more rigid.

Blistered back of left ear on the 26th, and as symptoms of bromism existed, the amount of bromides taken daily was reduced one-half. No evening elevation of temperature to-day, but light convulsive movements numerous in the forenoon, and occurring occasionally in the afternoon. The child is still peevish, but takes food a little better.

January 28.—No severe convulsion has occurred since January 21 until to-day, when two convulsions took place, and the light attacks are numerous.

January 30.—Increased the combination of bromides to full strength, and continued the same until bromism was again developed. A blister was placed back of right ear.

January 31.—The appetite not quite so good to-day, probably an effect of the bromides. The bowels have been kept open so far during his sickness by enema mainly, but sometimes by medicine given by the mouth. Gave four ¼-gr. doses of calomel to-day, repeating the same on February 1, when the bowels moved three times. The temperature on the evening of February 1 was 100.8°, late in the evening, this being the first elevation noticed for several days.

On February 2 the bowels moved three times again; no calomel given since the morning before; the light attacks not quite so numerous as on the 1st, but glands of neck becoming still more enlarged. Bromide mixture reduced down to one-quarter strength, but continued the iodide as usual.

February 3.—Light attacks not so numerous as yesterday; appetite poor; bowels

moved three times again. In the afternoon he awoke from a sleep of about three hours with considerable dulness, and in about twenty minutes had a convulsion, lasting for two or three minutes. As I have not described any of these convulsions, I will do so in regard to this one, as I had an opportunity of witnessing it. It commenced with a twitching of the hands and a falling forward of the head. At the same time the arms were thrown upward towards the head, eyeballs turned upward, and a rapid moving of the jaws occurring, followed by partial opisthotonos, and recovering from the convulsion with a gasping and a yawning, and then a cry as if from fright. At no time in any of his convulsions was any frothing of the mouth observed, nor was the tongue bitten. These severe convulsions generally lasted for several minutes, the first one that he had being about the longest one in duration, viz., about twenty minutes.

February 4.—Ceased giving the bromides to-day, as there did not seem to be any benefit arising from their use. Another convulsion to-day, but not quite so severe as the one yesterday. Gave three ¼-gr. doses of calomel to-day.

February 5.—Bowels moved twice to-day. Appetite seems to be improving since suspension of bromides.

February 6.—Blistered back of neck. Child seems a little brighter to-day.

February 8.—No change since the 6th in his condition. Gave four ¼-gr. doses of calomel to-day.

February 9.—Another convulsion occurred, but not quite so severe as the last one.

February 11.—Blistered back of right ear.

February 14.—Not quite so well to-day as he has been; light attacks (convulsive) more numerous.

February 17.—Light convulsive attacks not quite so numerous. Bowels moved by giving two ¼-gr. doses of calomel. A blister was placed back of right ear.

February 18.—Light attacks not so numerous, but for the last four days he cannot control the passing of water. Appetite during this period seems better. Gave four ¼-gr. doses of calomel, but bowels moved only after an injection had been given late at night.

February 19.—Slight symptoms of salivation presented, but otherwise he remains about the same. The light or momentary convulsions, which have been occurring every day for several weeks, ceased to-day about noon, but their cessation was preceded by a convulsion of four or five minutes' duration.

February 21.—A blister was placed back of left ear.

February 25.—No light attacks have occurred since the 20th. Bowels, although very constipated, have moved naturally for the last three days. Blistered back of right ear. Commenced giving cod-liver oil to-day, and anointing the enlarged glands with an ointment, viz., ungt. belladonnæ, ungt. hydrarg., equal parts.

February 27.—Light attacks commenced again to-day, and in the evening he had four convulsions.

February 28.—Blistered back of neck.

March 2.—Another convulsion to-day. Bowels still constipated, but moving naturally. A little blood has been noticed on fæces for several days. This appears to be hemorrhoidal in character, and is probably due to the constipation.

March 4.—During the night had three convulsions. Have run the amount of iodide up to 12 grs. per day.

March 8.—Three convulsions in the morning. Iodide has been gradually increased until 30 grs. per day are taken, and symptoms of iodism developed.

March 9.—Dropped iodide to 16 grs. per day.

March 13.—A convulsion occurred in the morning; light attacks very numerous; he also has the hiccoughs.

March 23.—The hiccoughs, although severe for several days, have ceased; one convulsion to-day.

March 27.—Two convulsions.

April 16.—For the last two or three weeks light attacks occur almost constantly during the day. The child cannot walk nor stand alone; cannot feed himself. The dull expression about the eyes is now very marked, and his appearance is one of helplessness. The boy has been losing flesh very rapidly.

April 19.—Two convulsions to-day. After they had occurred he has better use of his limbs, being able to stand alone.

May 15.—A convulsion during sleep, and the first one noticed to occur while sleeping. The light attacks do not now occur. Muscles of neck are not quite so rigid, and the glands are lessening in size.

From May 15 the patient has gradually improved. No convulsions have occurred up to the date of writing this article (November 13, 1886). The stiffness of muscles of back of neck still exists to a slight extent. The lymphatic glands are also a little enlarged, but both the stiffness of muscles and enlarge-

ment of glands are still subsiding. He has improved in his speech, eats heartily, and is quite active upon his feet. He has gained considerable in weight, and seems almost as well as previous to his severe illness. The number of severe convulsions which the child had is about thirty-five, and these were from one to twenty minutes in duration.

GALVANISM AND BROMIDE OF QUININE IN THE TREATMENT OF CHRONIC CATARRH OF THE MIDDLE EAR.

By J. A. Patterson, M.D., Salem, N. J.

CHRONIC catarrh of the middle ear and its usual attendant, tinnitus, is a disease whose treatment has never been very satisfactory.

In the great forward strides made in both therapeutics and surgery at the present day the treatment of this affection has made comparatively very little advance, therefore I offer these remarks, crude as I know they are, hoping they may be of some value towards the more successful relief of tinnitus aurium and progressive loss of hearing.

I have many times been struck by the similarity of cinchonism and the symptoms of catarrhal deafness, and reasoned that quinine must have some specific action upon the middle ear, for we know where cinchonism has been kept up in a patient for a lengthy period a chronic congestion of the middle ear is often produced, leaving impairment of hearing in greater or less degree, and often tinnitus.

Reasoning from analogy, I determined to try the effect of quinine in small doses in such cases, but in two instances in which I used the sulphate my patients derived no benefit. Now, it is a well-known fact that bromine in its various combinations, as bromide of potassium, sodium, etc., controls and lessens the blood-supply to the cranium, and will often mitigate somewhat the roaring which these patients experience in their diseased ears, so I thought that probably a combination of bromine and quinine would act better. Accordingly I procured some bromide of quinine. The first patient upon whom I tried it was a lady with history as follows:

Right ear: abscess three weeks ago; drum membrane shows pin-point perforations, opening valve-like upon inflation of the middle ear; watch heard at four inches. Left ear: hearing *nil* from purulent catarrh, which followed scarlet-fever in childhood, and existed up to the age of thirteen years. Deafness and tinnitus in both ears,—in left ear for a number of years, in right ear progressing for the past six or eight months. She consulted me very irregularly for several months, and was somewhat improved by galvanism applied directly to the ear, one electrode, moistened with a saline solution, being introduced into the external auditory meatus, and various remedies. Upon May 20 I put her upon grain-doses of bromide of quinine t. i. d. In three days she returned, saying she had used the medicine faithfully, but it increased the tinnitus so much she had to abandon it, since which time it has decreased to its usual intensity. She frankly stated she believed I had given her quinine, as she readily detected its usual effects upon her, and as I compounded the recipe in person, I knew she had no opportunity of reading the prescription. I then gave the drug in ¼-gr. doses t. i. d., with slight improvement. June 10 I began giving it in $\frac{1}{10}$-gr. doses four times a day, still continuing the use of galvanism, when the hearing began gradually to improve, until it reached in right ear nine inches for watch; tinnitus *greatly* improved. She has now stopped treatment, saying she hears well enough, and the tinnitus is so slight as to cause no annoyance.

The second case. Mrs. ——, æt. 55, came to me for deafness of many years' duration and intolerable tinnitus of over a year's duration. There was found to be a large perforation in the membrani tympani of each ear, following aural discharges in very early childhood. Watch could not be heard at contact in either ear. Under three months' treatment, by weekly applications of the galvanic current, and quinine bromide $\frac{1}{10}$ gr., four times a day, there has been a gradual improvement in hearing, first by hearing the watch at contact, and on last consultation she reported having heard the entire sermon at church, sitting in her accustomed pew, the same clergyman as usual occupying the pulpit; the first sermon she had thus enjoyed for some years. The tinnitus has greatly and decidedly improved, and from being very despondent she is in much more cheerful spirits owing to its decrease. She is now out of town on a prolonged visit, therefore I have for the time lost trace of the case.

Other cases in which I had begun giving this remedy have failed to report themselves, consequently no data can be thus obtained.

In conclusion, I would say that systematic, prolonged use of galvanism, combined with systemic treatment, will do more for the relief

and cure of chronic catarrh of the middle ear than any mode of treatment I have yet tried (attention to the health of the nasal and pharyngeal mucous membrane, of course, never to be overlooked or neglected). It is necessary that the physician should know that the results are often slow and gradual, although in some instances very rapid results are obtained, as the following case will show:

A. C. K., æt. 56, consulted me November 17 for tinnitus and deafness in left ear for past ten months, gradually increasing. Politzer's inflation shows Eustachian tubes patulous, although there exists a chronic rhinitis. Membrana tympani intact and of dusky hue. I prescribed an alkaline wash for the nose, and applied galvanism.

November 23.—Since last consultation no tinnitus, and hears better.

December 7.—Hearing improving; momentary returns of the tinnitus noticed; same treatment.

December 29.—Been entirely free of tinnitus for two weeks, which is the longest freedom he has had for nearly a year. Hearing greatly increased, so as to be now, he thinks, normal. He then discontinued treatment.

I close, hoping to be able to report continued good results from the bromide of quinine treatment.

213 BROADWAY, December, 1886.

THERAPEUTIC INDICATIONS IN DIFFERENT TEMPERAMENTS.

BY W. G. KEMPER, M.D., OMAHA, MO.

THE recognition of the temperament of a patient is in many cases nearly as important as the diagnosis of the disease. It would be better understood why maladies in a given family have certain peculiar features and tendencies, and the treatment, as well as the prognosis, would be simplified if the subject was always taken into consideration.

The physician who, by long practice and careful observation, has acquired a knowledge of the peculiarities of his patients, is said to "know their constitution," and is, therefore, trusted to a greater degree, and deservedly so, for his methods are more scientific and successful than the practice of many who apply routine remedies to the same disease without taking the temperament into consideration. Idiosyncrasies and the unusual action of drugs, instead of surprising us, should be expected.

In olden times temperaments were supposed to be due to the relative presence of *fire*, *water*, *air*, and *earth*, and were divided as follows: "The *choleric* where the warmth, the *phlegmatic* where the moisture, the *sanguine* where the air, and the *melancholic* where the earth has the upper hand."* But it is now understood that the temperaments are due to the relative development and energy of the nervous, muscular, lymphatic, or circulatory system.

The words constitution, diathesis, and cachexia are sometimes *mis*used for temperament. *Constitution* refers to the state of health, or the power to resist disease; *diathesis*, a tendency to certain diseased conditions; and *cachexia*, the actual presence of a certain diseased state.

The NERVOUS (*Mental*) temperament, depending upon the predominance of the nervous system, is characterized by a comparatively large head and small body; a long face, with a high forehead; the bones and muscles small but well formed; chest and shoulders narrow; the complexion is usually light, but may be dark; the skin delicate, generally moist, but rough when dry; the hair fine, soft, dry, and not abundant; the teeth small and separated; nutrition is imperfect; the appetite poor; stomach and viscera small; not much adipose tissue. Urine is abundant, containing alkaline phosphates; the fæcal discharges small. The pulse is small, hard, and quick; the movements quick and active. There is great activity of the mind, a lively imagination, an excellent memory. Great sensitiveness to pain, and but little power to resist disease or starvation. Often displays idiosyncrasies, and is therefore difficult to treat. The diseases are usually due to overwork. In many cases a tendency to insanity, neuralgia, and other nervous affections is present. In low fevers there is apt to be great restlessness, delirium, and much wasting. In the treatment, rest, nourishment, tonics, and sedatives are indicated.

The MOTIVE (*Bilious*, *Choleric*, *Melancholic*) temperament, depending upon the predominance of muscular system and its "supply depot," the liver, is distinguished by a long angular figure, with firm, rather full, muscles; the face narrow, of dark, sometimes sallow, complexion; hair and eyes dark; the skin dense; nails hard and of slow growth; the teeth large; stomach and viscera small; pulse hard and slow; disposition harsh and stern,

* Lavater.

often sad; nervous system in good condition, but prefers physical to mental labor; but little tissue-change takes place, hence little food is required; great power of endurance to pain, starvation, or disease. Biliousness and malaria are the most common diseases in this temperament. Purgatives are usually indicated. In low fevers the prognosis is good, as there is but little waste.

When this temperament is blended with the nervous, we are apt to find a small figure, with a dark complexion, whose movements and actions, though generally slow, are quick, active, and passionate when aroused. When blended with the sanguine, the nervous system being poorly developed, we have the immense bones and muscles and comparatively small head of the prize-fighter.

The SANGUINE (*Vital*) temperament, depending upon the predominance of the circulatory system, is recognized by the broad, rotund figure; full chest; muscles firm and well developed; face round and florid; hair and eyes light; skin smooth and fair; the nails pink and soft; the teeth even and undecayed; abdomen well developed, and the digestive powers perfect; disposition pleasant and cheerful; nervous system in good order; blood-making powers strong; the actions and movements strong and graceful; pulse strong and frequent. The urine is of high specific gravity; the fæcal discharges small. There is great resistance to disease, but when affected it takes an active, rapid course. Inflammation, gout, rheumatism, and allied disorders are most frequent; and the remedies indicated are blood-letting, sedatives, alkaline salines. In low fevers the prognosis is unfavorable, on account of the high fever, but the crisis once passed will rapidly recuperate.

As age advances this temperament often becomes blended with the following:

The LYMPHATIC (*Phlegmatic*) temperament, depending upon the preponderance of the lymphatic system, is characterized by the large, bulky body; broad shoulders; bones large; muscles large and flabby; short, fat neck; round, pale face; light hair and eyes; skin dense; nails large and brittle; teeth large; abdomen large; great amount of food required; nervous system not well developed; mind not active, but the memory good; moves about slowly and indolently; circulation slow; pulse slow and soft; dilatation of the heart; constipation, diarrhœa, piles, and other bowel complaints are the most frequent diseases. Inflammations are not usually severe, but are apt to become chronic. Fevers seldom high. Purgatives, stimulants, and heart tonics are indicated. In low fevers the prognosis is bad, and convalescence extremely slow, requiring plenty of food, stimulants, and tonics.

Polysarcia usually comes on after middle age, which may be prevented by exercise, nitrogeneous food, and but few liquids, especially during meal-time.

Where all the temperaments are blended we would expect to find a perfect constitution, that, like the *wonderful one-hoss shay*, would *wear out*, but never *break down*.

1336 S. 17TH ST.

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*APOCYNUM CANNABINUM IN DROPSY.**

BY J. A. LEWIS, M.D., ITHACA, N. Y.

IN reply to the query of Dr. Peters I have to report the history of a few cases of pleurisy with effusion treated with apocynum cannabinum. I prefer to give those cases that fell in my hands after the effusion was well marked.

CASE I.—J. C., aged 13, male, January 15, 1885. Was taken sick January 7 with initiatory chill, followed by high fever, cough, and rapid respiration; effusion well marked; level of fluid at fourth rib. Treatment: fl. ext. apocynum cannabinum, ℥i. Five drops every three hours.

January 19.—Feels better; fluid disappearing; at level fifth rib.

January 29.—Fluid entirely gone; appetite good; temperature and pulse normal; discharged.

CASE II.—January 24, 1886. George P., aged 18; barber; taken sick with pain, fever, and rapid respiration.

January 1.—Confined to bed two weeks; improved, and was able to walk out; had been treated for intercostal neuralgia. Physical examination revealed the fact that his left pleural cavity was entirely filled with fluid; was given fl. ext. apocynum cannabinum 20 drops every four hours; free catharsis took place after the fourth dose; drug diminished to 10 drops every four hours; rapid recovery took place, with complete expansion of lung and normal respiration February 15.

CASE III.—March 28, 1886. John C., aged 14; waiter-boy on railroad. After violent exercise, February 10, 1886, was taken with chill, followed by fever, cough, slight pain in side. Nothing was done for him

* Read before the Materia Medica Section of the New York Academy of Medicine.

until he came to me, March 28; right pleural cavity nearly filled with fluid. Treatment: fl. ext. apocynum cannabinum. Ten drops every four hours were given. Lived six miles from me, so did not see him again until June, when I met him by accident. His story was that he got well in a week, and went to work May 3, 1886.

CASE IV.—Mrs. P., aged 43. History of latent pleurisy of four weeks' standing of left chest; complete flatness on percussion; heart to right of sternum; no vesicular murmur in lung. Change of position did not alter the physical signs. Advised aspiration, which she would not consent to until drugs had been tried. Treatment: fl. ext. apocynum cannabinum, gtt. xv; potassæ iodidi, gr. viii, per dose every four hours.

May 5.—Feels a little better; treatment continued, and by May 18 all fluid had disappeared, and she has remained well since.

CASE V.—Susie G., aged 23; shop-girl. History of latent pleurisy; right chest filled with fluid to fourth rib; has been treated for intercostal neuralgia. Treatment: fl. ext. apocynum cannabinum, gtt. x, every four hours. Fluid rapidly disappeared, and she remained well until December, when I was called by Dr. Winslow to see her at his office. She then had aphonia from ulceration of the vocal cords, which is undoubtedly laryngeal phthisis. There was no fluid in the chest. He has since lost track of her.

CASE VI.—Harris B., aged 3, son of Dr. Beckwith, of Ithaca. Taken sick July 10; chills, fever, slight cough, and pain in abdomen. Was asked by the doctor to see him July 18, when we found right chest nearly filled with fluid. Advised fl. ext. apocynum cannabinum, gtt. ii, every two hours, until free catharsis took place, then to diminish to 1 drop. The fluid entirely disappeared in fourteen days. He has since remained well.

CASE VII.—Grace C., aged 4 years. History of acute pleurisy, commencing November 10; right chest filled with fluid. Treatment: fl. ext. apocynum cannabinum, gtt. iv, every four hours; complete recovery in fifteen days.

MULTIPLE ABSCESS OF THE LIVER.

BY J. A. BACH, M.D., MILWAUKEE.

ALTHOUGH by most surgeons the early evacuation of an abscess is considered a surgical axiom, it has many times occurred to me why non-interference in abscess of the liver is so generally advised. Even with our present knowledge of antiseptic surgery our authors are extremely cautious, and seem to be fearful of bad consequences in the event of free opening and drainage of abscess of the liver.

During the last few weeks I had occasion to meet with a very remarkable case of multiple abscesses of the liver, resulting from pyæmia, the treatment and the results of which might be of interest. The history of the case is briefly this:

Albert Schuette, æt. 9, residing at 302 Twenty-fourth Street, while playing about the school-house, fell and struck upon his left hip, while another little boy fell upon him, striking his body at about the region of the liver. The next day he complained of pain in his left thigh, and also of difficulty of breathing, probably from a slight pleurisy. The parents of the little boy, thinking this only transient, did not pay any attention to it until about the tenth day, when I was called. Upon examination I discovered a large abscess on the left thigh, which seemed to involve the periosteum of the femur. I also discovered a great enlargement of the liver, in the region of which the boy felt a good deal of pain. At this time that peculiar pasty, jaundiced, and exhausted appearance was quite prominent. Temperature 103°, pulse 128. The abscess on his thigh was freely laid open, and discharged from four to five ounces of pus. The after-treatment with carbolic acid washes, etc., soon effected a complete cure of this, but the temperature still remained high. I directed hot fomentations over the liver, and in a few days, upon re-examination of this region, the liver was still much enlarged and quite sensitive. In the lower region of both the right and left lobes of the liver I now discovered two tumors, each about the size of a goose's egg. The tumors being rather deep-seated, I could not clearly detect fluctuation, but verified the presence of matter therein by the introduction of the hypodermic needle, with which I withdrew about five grains of pus. I now directed poultices of linseed, and after a few days the tumor of the right lobe could be much more clearly felt, as it began to point outwardly. Fluctuation could now be felt, and as the case was quite urgent, temperature 103½°, pulse 130, and the boy was rapidly losing strength, I decided, without waiting for any further developments, to freely lay open the abscess, and accordingly the next day, with the assistance of Dr. Frank, this was

done. A careful incision of about two inches in length, and extending down into the cavity of the abscess, gave vent to about four ounces of thick, greenish pus. As this discharged, care was taken not to allow any to leak into the peritoneal cavity. After evacuation of the abscess, a horseshoe rubber drainage-tube was introduced, through which the cavity was carefully washed out every day with carbolic acid solution. After three days the abscess of the left lobe was treated likewise. Of course, before as well as after the operation, antiseptic precautions were taken. The boy made a perfect recovery.

48 Juneau Avenue.

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*PERMANGANATE OF POTASSIUM IN AMENORRHŒA.**

By Dr. H. I. Boldts, New York.

IN view of the interest and importance of Dr. Billington's paper, and the discussion which it has evoked, I have looked over my records, and report the results and the conclusions at which I have arrived.

I have been able to follow forty-three cases, and find that in the class of robust persons who have recently made a sea-voyage, have then menstruated scantily, or missed altogether two or three times, that the permanganate of potassium, given in 1-grain doses three times daily, after meals, up to within one week of the expected catamenia, then the dose to be increased to 2 grains three times daily, it has been effectual and permanent in each instance, the number of cases of this class being fifteen.

Out of seventeen patients who were anæmic or chlorotic, only two patients derived benefit from the permanganate of potassium treatment employed alone; one of these, a chlorotic, at her next epoch, she having missed four months entirely, and the two preceding periods being very scanty, the flow lasting only a few hours, had such profuse flow that I felt it necessary to give ergot. The remaining fifteen patients derived benefit, more or less, only by general tonic treatment, viz., hygienic, dietetic, and medicinal.

The next class of patients, eleven in number, were well nourished, some plethoric, and no particular cause could be found for the amenorrhœa. In seven of these the remedy produced the desired effect one time only, in three for two months, and in one for three periods; after that the drug had no effect. In three of the first seven cases the epoch was established again regularly and normally, without any more cause than could be found for the origin of the complaint.

My conclusions, then, are: That in such as the first class of patients cited, the permanganate of potassium is "the" remedy. In the second class, it is of service only when employed in connection with such treatment as would have a tendency to overcome or help the cause of the amenorrhœa; and in the third class the results are very variable, failures being, in my experience, the preponderance.

With the binoxide of manganese my experience has been too limited to speak. The administration of the remedy has given the best satisfaction in my hands when the crystals are put up in ordinary gelatin-capsules, one capsule to be taken after eating, followed by a glass of milk or soda-water. The gastric disturbance has then been usually very little or none; but four patients out of the total number of forty-three have had much cause to complain. The number of patients for whom the remedy has been prescribed has been considerably larger; but, as we all know in public practice, it is very difficult to keep patients under observation, as is also the case with many private cases. The mentioned number, however, have been successfully observed by me. Dr. Billings, I believe, mentioned the usefulness of the potassium salt also in menorrhagia. I have tried it also in this condition a few times, but with total failure. The hydrastis canadensis has given fair satisfaction for this complaint in my hands. Lately, the latter drug has also been recommended by Mendes de Leon in this and other pathological conditions of the female organs of generation, such as dysmenorrhœa resulting from displacement of the uterus, and chronic pelvic cellulitis.

411 Sixth Street.

* Read before the Materia Medica Section of the New York Academy of Medicine.

PILOCARPINE IN RHEUMATIC TETANUS.

Brünauer treated a case of tetanus of rheumatic origin, where the slightest irritant produced violent spasms, with subcutaneous injections of pilocarpine, 2 centigrammes in each dose. Other modes of treatment tried during five days had failed. The injections, with use of the chloral at night, resulted in recovery after an illness of two weeks.—*Deutsche Medizinal Zeitung*, No. 61, 1886.

The Therapeutic Gazette

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HORATIO C. WOOD, M.D.,
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ROBERT MEADE SMITH, M.D.,
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Leading Articles.

CEREBRAL PNEUMONIA.

IT is but a trite saying that in pneumonia the cerebral symptoms may be so severe as to mask the lung-disease, but as the time of year is upon us when cases of this character are especially apt to occur, we feel justified in calling attention afresh to the subject.

In old people, and especially in drunkards, delirium may be so violent as to call attention away from the pulmonic symptoms, which, indeed, may be so slight as not to be perceptible at all, except in that counting the respirations will usually show a marked acceleration of the breathing rate.

In children the evidences of the symptoms of a cerebral inflammation may appear to be complete. Headache, constipation, great prostration, fever, delirium, convulsions, opisthotonos, and strabismus may unite to form a picture of an attack of cerebro-spinal meningitis so close to reality that even a careful, well-informed practitioner may be misled. In some cases there is a peculiar cry like that of meningitis. If, under these circumstances, the cough be suppressed, suspicion may not be at all aroused. Moreover, even if the practitioner be wide awake, the physical signs of pneumonia may be so masked as scarcely to be discoverable. Grisolle, as quoted by Prof. Alfred L. Loomis, affirms that in a majority of cases of senile pneumonia exploration of the thoracic organs gives negative results. We think that this statement is not absolutely correct. We have seen a number of cases in which the crepitant râle was entirely absent, some in which even bronchial breathing was suppressed, and others in which the only physical signs were an absence of true respiratory murmur and dulness on percussion. It is possible that a transmitted respiratory murmur may in some cases be heard, but we can scarcely conceive that distinct percussion dulness can be absent in pneumonia of the adult.

In young children the pulmonic physical signs may be exceedingly obscure. Some years since it was our duty to perform an autopsy upon a child who had been attended by the late Dr. John F. Meigs and another practitioner whose name we omit, as its possessor is still living. The child was the son of a leading merchant, was attended with the utmost care by these two gentlemen, who would at the time have been acknowledged to be the leading practitioners of Philadelphia. Nevertheless, after the baby had been treated for nearly two weeks for pneumonia of the right lung, the autopsy showed that the right lung was nearly normal, only secondarily congested, whilst a pint of purulent effusion filled up the left chest cavity. Quite recently we saw a case in a child three years of age in which the symptoms were high fever, convulsions, strabismus, fixed rigidity of the neck, with, on the third day of the disease, collapse, from which a reaction was with great difficulty obtained. The most careful examination by Professor Da Costa and ourselves, on the third day of the disease, revealed only slight relative dulness over the posterior portion of the right lung. No change was perceptible on auscultation, and even the percussion note was distinctly tympanitic, only a little less so than that of the opposite side. After death, which took place on the sixth day, pneumonia was found, with intense congestion of the brain and of the pia mater, but no fibrinous or purulent exudation at all about the brain. There was much more serous fluid in the brain than should have been, but microscopic examination failed to detect any outwandering of corpuscles from the vessels or any pus-corpuscles.

The matter is made still more difficult by the fact that meningitis may develop in pneumonia. It probably is not possible to say

with certainty in a case of pneumonia, whether the meningeal symptoms are the outcome of a true meningitis or simply of a meningeal irritation. The practical fact, however, in these cases is that the pneumonia is the important primary affection, against which in chief part treatment must be directed. When the physical signs are very much masked, aid in the diagnosis can be often obtained from the symptoms themselves. Thus, especially in children, the temperature is much higher in cerebral pneumonia than in simple meningitis. In the case which has already been detailed the temperature, although checked by the free use of antipyrin, and repeated applications of cold to the head and body, several times reached 106.8°, and would, we believe, if it had not been interfered with, have gone to a point at which it would have killed the child by thermic fever.

The importance of the temperature is enhanced by noticing that it is out of proportion to the intensity of the meningeal symptoms. Thus, in our case, on the fifth and sixth days of the disease the meningeal symptoms were less marked than they were on the fourth day; the neck was not quite as stiff, there was no increase of stupor, the strabismus was less, rather than greater than it had been, and no convulsions occurred after the beginning of the second day. Fulminating sthenic meningitis is an excessively rare disease in children; although it is elaborately described by writers, we are sometimes tempted to doubt its existence, and to believe that the cases in which the diagnosis has been confirmed by the autopsy were really instances of the constitutional affection in cerebro-spinal meningitis, or were examples of imperfect autopsies at which the attention has been drawn away by the secondary affection from some original lesion.

THE TREATMENT OF WHITLOW.

FROM time immemorial the treatment of whitlow has consisted in the early performance of deep incisions carried down to the bone and prolonged poulticing. This routine treatment is in the main accepted by most surgeons, yet great varieties of opinion are held as to the time when incision should be performed, the locality, and the duration of poulticing, it being held by many that the necrosis that so often follows this affection is due to the prolonged heat from the poultice as much as to the disease itself. The subject recently has been attracting considerable attention, and Mr. Allingham (*Medical Press*, September 29, 1886) shows that there are several varieties of whitlow, and each of these requires a special mode of treatment. Mr. Allingham described five varieties of whitlow. The first, which he terms phlyzacious pustule, is nothing more than an accumulation of fluid between the epidermis and true skin. Of course, all that is required is to puncture the blister and let out the fluid. In another form, a collection of pus may form under the nail, as a result of a puncture or a breaking down of blood, following a pinch, and may give rise to considerable pain of a throbbing character. In the treatment of this class of the disease, Mr. Allingham recommends the insertion of a hare-lip pin, or some such narrow-bladed instrument, beneath the nail, keeping it quite close, so as not to wound, if possible, the tissue beneath, passing it down to the collection of pus, and then depressing the needle, and then allowing the pus to flow out. This gives instant relief, and prevents the matter from burrowing beneath the nail, and so separating it from its bed. Poulticing and waiting for the pus to work itself to the surface will entail a needless amount of unnecessary suffering upon the patient. Another form of treatment, which may be employed when the collection of pus is situated at the root of the nail, is to cut away the nail from the seat of the inflammation.

Under the term cellular whitlow, Mr. Allingham describes the inflammation of the cellular tissue covering the terminal phalanx, where the bone is free from periosteum. Inflammation of this locality, by producing strangulation of the vessels, cuts off the supply of blood to the part, and as a result causes necrosis of the phalanx. Almost as soon as the first symptoms of this affection develop, as may be recognized by acute pain in the part, with the tip of the finger swollen, tender, tense, and sometimes red, a free incision should be carried directly down to the bone, and necrosis of the terminal phalanx will thus often be prevented. When cases come under observation in which necrosis of the phalanx has already taken place, deformity may be prevented, according to Mr. Allingham, by making an incision along the palmar surface of the finger, removing the necrosed bone, and placing a narrow splint on the back of the finger, allowing it to project half an inch beyond the nail. The nail should then be fastened to the splint by adhesive plaster, so as to prevent it curling

up, and it thus may act as a background on which new bone may develop.

The fourth form of whitlow described is an inflammation in the sheath of the tendons over the first or second phalanx. It may arise from inflammation spreading from without, or by a purulent inflammation of the synovial sheath of the flexor tendon. The great dangers arising from this form of whitlow are that the tendons may be destroyed, the inflammation extend into the joints, or the pus find its way into the palm of the hand. The finger in this affection soon becomes swollen and flexed, and is the seat of severe throbbing pain, the part is hot, and in the latter stages deep-seated fluctuation may be recognized. If this is allowed to progress, the whole finger may become involved, so as to present two swellings separated by a constriction corresponding to the joint.

The treatment of this affection is identical, according to Mr. Allingham, with that of periosteal whitlow, from which, in fact, the tendinous inflammation can only be recognized with very great difficulty. Mr. Allingham is strongly in favor of treating these affections by lateral incisions, for on account of the difficulty of recognition of the locality of inflammation, should the inflammation be confined to the periosteum, the central incision must be carried through the tendons to reach the bone, of course unnecessarily damaging the tendon. Mr. Allingham, therefore, recommends the lateral incision, claiming for it the following advantages :

First.—As it is difficult to tell whether the whitlow is periosteal or tendinous, by the lateral incision, if it should be periosteal, no damage is done to the tendons by cutting through them.

Second.—By lateral incision the tendons cannot prolapse from their sheaths, and therefore the liability to gangrene is diminished.

Third.—After this method of treatment the finger can be flexed, and so relax all the structures and relieve pain, whereas by the central incision the finger should be kept straight, to prevent the tendons slipping out of their sheaths ; at the same time straightening such inflamed part greatly increases the pain.

Fourth.—If the incisions are on the side they are less likely to be pressed upon, for the cicatrix may become tender, which, if in the centre of the hand, is exposed to pressure every time the hand is closed. Again, a cicatrix in the middle line may contract, and cause the finger to become permanently flexed, whereas, if the incisions are at the side, such a result could not take place.

So much for the most recent opinions as to the surgical treatment of whitlow, a mode of procedure which is unavoidable when pus has collected.

The less severe forms of furuncular inflammation may be aborted in many cases, according to Dr. Weiss (*Medical Record*, November 27, 1886), by the inoculation of resorcin, a plan which he has employed, as follows :

A number of shallow parallel incisions about one-quarter of an inch long are made in and around the lesion and through the integument, pain being prevented by the use of a twenty per cent. solution of cocaine and ten per cent. resorcin. Lanolin salve is then applied in a very thick layer to the scarifications. The entire part is enveloped in a strip of lint, which, in turn, is to be thoroughly saturated with the salve, and over this a layer of gutta-percha tissue, absorbent cotton, and moist gauze bandage may be applied in the order mentioned.

Dr. Weiss reports a number of cases in which the employment of this mode of treatment in twenty-four hours produced complete cessation of pain and arrest of inflammation.

Of course it can hardly be expected that this mode of treatment would operate in the more serious cases of periosteal or tendinous inflammation, but it seems well worthy of trial in the less grave forms of phlegmonous inflammation.

THE ACTION OF ARSENIATE OF STRYCHNINE.

FOWLER'S solution, the most ordinarily used of all preparations of arsenic, possesses, together with undoubted advantages, a certain number of objectionable features, which have long been recognized by the practitioner.

The chief advantages of the drug consist in the ease of its resorbability and its signal tonic properties. The principal drawback connected with this useful remedy is the quickly-established habit of the drug on the part of the organism. On account of this habit the physician is naturally forced, if he wishes to continue the use of the drug, to constantly enlarge its dose until the borderline of toxic dosage has been reached. In fact, there are a number of instances recorded where this line was transgressed, and more or less severe intoxications ensued.

Employed subcutaneously, Fowler's solu-

tion is exempt from the disadvantages just stated; but, on the other hand, possesses a very inferior degree of medicinal efficiency. It is, then, with natural interest that we turn our attention to a new combination of arsenic —the arseniate of strychnine—discovered and clinically tested by Dr. J. Russel. Recent issues of *La Semaine Méd.*, *Allgemeine Med. C. Zeitung*, and *Wiener Med. Blätter* (September 9, 1886) devoted considerable space to this novel therapeutic agent.

It is claimed that the drug has given excellent remedial results, and that it acts not only as arsenic but also as strychnine. The preparation, which is soluble in water and glycerin in every proportion, is well suitable for hypodermic medication, produces no pain, and is easily absorbable.

Nevertheless, Russel recommends to use in the beginning only small doses, as a dose containing $\frac{1}{6}$ of a grain of arseniate of strychnine produces toxic symptoms when exhibited in the beginning of the treatment. The author himself employs usually a solution of 1 to 250. He begins with $\frac{1}{4}$ to $\frac{1}{2}$ of a syringe, and gradually arrives at the full syringe, containing $\frac{1}{16}$ of a grain.

Russel states that the effect of the foregoing full dose is peculiarly striking in the premonitory symptoms of the acute infectious diseases, such as malaise, depression, muscular lassitude, etc., the patient feeling revived, as it were, after a single injection. This singular effect of the drug has been so constantly observed by the author in the above conditions that he employs it systematically in all affections marked by a great reduction of vital energy.

The main importance, however, of the new remedy consists in another and entirely different feature,—*i.e.*, in its powerful antiseptic properties, which raise the drug to an agent of the highest rank and service in typhoid fever. Such, at least, is the conviction and the claim of Dr. Russel, who, within the last four years, has repeatedly succeeded by means of this drug to either abort an incipient typhoid fever, or to simplify the morbid process when already fully developed.

The following case, reported by Dr. Russel in this connection, invites our interest. Two sisters were attacked simultaneously by typhoid fever (ileotyphus), and for various reasons one of them alone was given into his care. The doctor injected a Pravaz syringe of the arseniate of strychnine, and had the success in finding his patient after eight days reconvalescing from a light case of abortive typhoid fever. The other sister was presented for treatment at the tenth day of sickness, when the patient had already entered the second period of the affection. Having instituted here likewise the treatment with arseniate of strychnine, the course of the affection was rendered simple, and recovery soon ensued.

It seems, then, as if the new drug is endowed with great disinfecting powers, capable of sterilizing, as it were, the soil on which the pathogenetic micro-organisms of typhoid fever vegetate.

In addition to this special indication, Russel recommends the drug also in combination with salicylate of iron in chronic anæmia and dyspepsia, and states that he has repeatedly tested the efficacy of the drug in these affections.

TREATMENT OF CHOREA.

IN a recent number of the *Medical and Surgical Reporter*, Dr. Hiram Corson emphatically calls atention to the value of cimicifuga racemosa in chorea of childhood. He affirms, as the result of fifty years of experience, that it is always successful in a brief time if a teaspoonful of a good fluid extract be given four times a day. This use of cimicifuga racemosa is a very old one, which was insisted upon by the late Dr. George B. Wood, and which, as pupils of that great master, we have long employed.

Some hundreds of cases of chorea have come under our care in the public service at the Philadelphia Hospital, and especially at the University Hospital. In the earlier years the fluid extract of cimicifuga racemosa was always relied upon and administered as soon as the patients presented themselves. Experience has emphatically taught us, however, that it is distinctly inferior to arsenic; so that at present every patient coming to the Dispensary with the St. Vitus' dance is put upon the arsenical treatment. In the few cases in which this fails, the next routine administration is of the fluid extract of cimicifuga. We can only explain the superiority which cimicifuga has asserted over arsenic in the hands of Dr. Corson by the supposition that the doctor has never used arsenic with sufficient freedom.

The arsenical preparation must be given in ascending doses until it produces evidences of its physiological action, and to order this requires a little boldness on the part of the physician. If, however, the patient be well

watched and the remedy be withdrawn as soon as puffiness appears in the face, no harm can be done. Cimicifuga is not an inert substance, as seems to be thought by some practitioners. Probably much of the cimicifuga that is administered has lost its activity, which appears to depend upon a volatile principle. But we have seen a teaspoonful of the good fluid extract, even in an adult, produce headache, with excessive giddiness and great prostration.

We may add that when, some years ago, the bromide of iron was highly recommended by Dr. Da Costa in the treatment of chorea, we made an extensive and thorough trial of it, and found its therapeutical action as near negative as we can well imagine. In a number of cases it simply did no good at all.

SUBSTITUTION OF DRUGS.

OUR attention has been called by a correspondent to the practice sometimes indulged in by apothecaries of substituting one substance for another in physicians' prescriptions. We do not believe that this is often done; at least we have, in many years of experience with the apothecaries in Philadelphia, never known of such an act. Of course it is unpardonable; and if we had our way, we would send to jail—solitary confinement with hard labor for a term of years—any apothecary who should do such a thing.

Knowing the weakness of human nature, we have always felt great sympathy with a druggist who suffers from having made a mistake in compounding a prescription. The most careful person is liable occasionally to slip; but substitution of one remedy for another, or one preparation for another, is a crime cold-blooded and without excuse. We are not sure that we would have any more compunction in wringing the neck of a person habitually guilty of it than the Western cowboy has in shooting an Indian or mobbing a Chinaman.

MENTHOLEATE, OR SOLUTION OF MENTHOL IN OLEIC ACID.

THERE have appeared from time to time in the THERAPEUTIC GAZETTE articles recommending solutions of menthol, and our attention has been called by correspondents to the fact that these alleged solutions are usually impossibilities. We referred the matter to Professor Joseph P. Remington, of the Philadelphia College of Pharmacy, who has favored us with the following communication:

"The unsatisfactory character of the solutions of menthol in ordinary use led the writer to try some new solvents with the view of improvement. Alcohol, chloroform, ether, oil of peppermint, and all similar solvents have the disadvantages of too rapid evaporation, and of distributing the menthol over surfaces with which contact is not desired.

"Oleic acid was substituted, and no difficulty was experienced in making a solution as strong as seventy per cent. Now, if menthol is of any value as an external application, its usefulness is probably measured by the extent to which it is absorbed by the skin, and as oleic acid has been proved to be very readily absorbed, the *raison-d'être* of the new solution is disclosed.

"It is best prepared by placing two hundred grains of menthol in a test-tube or beaker, adding half a fluidounce of oleic acid, and heating gently until solution is effected."

THE PREVENTION OF FEVER IN A MALARIOUS COUNTRY.

IN the *Journal d'Hygiène* Schmit notices the popular belief of the inhabitants of malarious countries that cold is a powerful factor in predisposing to malarial intoxication. During the dangerous season such inhabitants always cover themselves carefully.

Popular belief lays great stress on preventive means. Science has not demonstrated a successful vaccination against malaria.

It is true that in such regions races develop which are not affected easily by malaria, but this does not save workmen, travellers, and immigrants from suffering.

Quinine the author considers too short-lived in effect to be more than a palliative means. Tommasi-Crudeli has given the subject much study, and prefers arsenic in doses of $\frac{1}{60}$ grain of arsenious acid in gelatin covering. He has employed this extensively in the worst portions of Italy and Sicily, and among railroad laborers about Rome, with the best results. The remedy is cheap, and easily taken.

In 1883, for example, in the district of Bovino, one of the localities most severely visited by fever, seventy-eight persons were divided into two groups. To one the remedy proposed was given, with the result of perfect immunity, while the remainder were affected by malaria in all grades of severity.

In 657 railroad laborers treated in 1885, 402 were completely exempted, with 119 the results were doubtful, with 136 the treatment was unsuccessful.

A popular remedy, used by the Greeks, Romans, Arabs, and at Gaudeloupe, is the liquid resulting from boiling a finely-cut lemon until the bulk of liquid has been reduced one-third; the juice is filtered, and taken cold.

THE AMERICAN BOOK.

TO the multitudinous answers which the Old World has given to the famous question of Sir Sydney Smith, "Who reads an American book?" must be added the reply of Professor Polotebnov and Dr. Breuv, of St. Petersburg, who have just translated under their supervision the work of Dr. Duhring on the skin, a book which had been previously put into French and Italian.

WE notice, as one of the signs of increasing interest in therapeutics, the formation in Boston of a Therapeutical Society, for which we wish all prosperity and success.

Reports on Therapeutic Progress.

THE MANZANILLA-TREE.

The tree known in Venezuela as the manzanilla has the reputation of causing death to those inhaling air close to it. As to whether this reputation is deserved or not has been investigated by MR. L. JACKSON, who publishes his report in the *Medical Press* for October 13, 1886. On visiting a group of manzanillas, situated on a line of railway, he found them bordering a sheltered hill within a hundred yards of the sea. They were about fourteen in number, mostly luxuriant large trees, about the size of an average full-grown British elm, and slightly resembling them in the clustering of foliage. The leaves had a little of the semitransparency of lime- or linden-leaves, the grouping of leaves rather resembling that of the chestnut, the leaves indented like the plane- or the currant-leaf; the trunk and branches well formed, bark rather smooth, but greenish, perhaps from moss.

On the whole, they were handsome and so well grouped and intact that one wished to stop and sketch them, though the stagnant air of the place was unpleasant, apart from the risks attending its inhalation. Vegetation flourished in the neighborhood, though grass did not grow absolutely under the trees; but the absence of any mangrove thickets about there was noticeable.

The arrangements made with the agent for their removal were these: that the suitable season should be chosen, and the trees burnt down from the windward side during a favorable prevalent wind, bundles of brushwood to be rolled close with long poles and fired, the supply of which was to be large; the men employed were to have all their requirements as well as their superstitions attended to, besides to be covered and protected by leather all over, also to be provided with masks and gloves.

The agent, now dead, adhered to this proposal and carried it out. On one of the author's visits to the coast, the agent informed Mr. Jackson that almost all those trees had been burnt; about eighteen men had been engaged in it, four or five had died, almost all had been ill. Mr. Jackson saw one of them, who had come about a hundred yards for assistance, about ten days after leaving that work.

He was emaciated, and complained of pains in his limbs, which apparently were of a paralytic nature; he had also had very severe fever, and was apparently quite worn out.

After his departure, the agent said that he considered recovery hopeless in that case, as well as in all the cases of men that had been so employed throughout the undertaking, but that some of the men who had been employed only latterly and for a short time might survive the attacks, which did not at all resemble those of the local fever. He also considered that all the paraphernalia for personal protection had been entirely useless, and had imagined so from the beginning, as he had lived in Mexico and had had some previous knowledge.

The deadly influence of the manzanilla is hence no myth. It evidently produces a special paralytic fever, or combination of paralysis and fever.

There are also several other poisonous trees in the province. In one case, an estate manager, after a journey, was seized with severe pains in the head, followed by swelling of the head to a very large size, though apparently there was neither scratch nor bruise. He was treated medically, and soon recovered entirely; but the assigned cause

was simply the brushing of some branches of a tree or shrub (name unknown) against his head while riding on the journey.

The cases already mentioned cannot have been attributable to other causes. The local fevers, of which the whole of the workmen were victims, are of a depressing and virulent type, and intermittent.

The result of getting wetted in a stream or river, without subsequent rubbing dry, is sure fever of the same sort, but is specially fatal. In fact, the rivers appear to be poisonous on outward application. Damp feet from marsh-wading in Mr. Jackson's own case produced malignant eruptions; at another time he had three days' mild fever from accidentally slipping on the bank of a stream and wetting his head and arm in the fall.

OLEUM SANTALI OSTINDICUM AS AN ANTIBLENNORRHAGIC.

The *Allgemeine Medicinische Centralzeitung*, in Nos. 76 and 78, 1886, publishes a therapeutic discussion of oleum santali from the pen of Dr. Letzel, chief of the Munich Policlinic for Skin-Diseases, which claims our notice. We condense its important features as follows:

Posner, at a meeting of the Berlin Medical Society, appears to have been the first therapeutist to call attention to the value of oleum santali in gonorrhœa. Letzel has exhibited the drug since 1885 to nearly one hundred patients affected with gonorrhœa, and is anxious to communicate his results to the profession. At first the oil was given in emulsion, according to the following formula:

℞ Olei santali ostind., ʒiiss;
Muc. gumm. arab., q.s. ad emuls.;
Syr. cinnamomi, ʒv;
Extr. fl. coffeæ tostæ (1 to 5), ʒv;
Aquæ cinnamomi, ʒiv. M.

S.—Take a tablespoonful three times daily after meals.

In nearly one-half of the patients thus treated an unconquerable repugnance against this medication set in in a few days, and forced the doctor to resort to gelatin-capsules, which were readily taken and well borne. The dose of the oil, when given in capsules, was 5 drops twice or three times daily.

Of the one hundred cases treated, four showed a violent gastric or intestinal irritation, manifesting itself by copious diarrhœas or serious dyspeptic troubles. If these graver symptoms were an exception, says the author, lighter manifestations of gastric interference were almost the rule. Annoying ructus, pressure, and burning in the stomach, and finally a great thirst were almost invariably complained of, though they did not necessitate the discontinuation of the drug. The author lays great stress upon the time of taking the drug, and regards the time intervening between the meals as the most favorable one.

Letzel calls attention to a peculiar symptom which he noted in five of the cases treated by him, viz., a more or less severe congestive pain in the region of the kidneys. In two cases this pain became so intense that morphine had to be given subcutaneously. Posner, in the discussion at the Berlin Medical Society, above referred to, strangely makes no mention of this certainly noteworthy phenomenon, while Jullien, in his "Traité Pratique des Maladies Vénériennes" (second edition, Paris, 1886, fol. 68), refers to this secondary action of the oil. Jullien also describes a peculiar erythema urticatum balsamicum which in one instance resulted from the drug. The eruption appeared on the hands, arms, back, and chest, and soon extended over the entire body surface, attacking also the mucous membranes of the tongue, conjunctiva, and pharynx. The eruption disappeared in the course of another day after a very exhausting sweating.

These observations suffice that oleum santali cannot be regarded as an innocuous remedy. Especially the appearance of congestive symptoms in the kidneys ought to cause the practitioners to use the drug with caution. Patients that are put under this treatment must be informed that when pains in the back occur the remedy must be discontinued.

J. L. Milton ("Pathology and Treatment of Gonorrhœa," fifth edition, London, 1883, p. 109) believes that the truly astounding diversity of professional opinion as to the therapeutic worth of the oil of sandal-wood in gonorrhœa is most probably ascribable to the great differences existing between the single specimens of the drug, the high price of which induces adulterations with castor-oil and balsam of copaiba.

Dr. X. Hager, in his supplement to the "Text-Book on Pharmaceutical Practice," Berlin, 1883, pp. 792–795, gives a series of tests regarding pure oil of sandal-wood.

The following comprises a summary of Letzel's experience with oil of sandal-wood in gonorrhœa:

1. At first the drug decreases considerably the gonorrhœal secretion, and changes its color from green to a milky hue. The pain conse-

quent to urination and erection diminishes, and disappears wholly in a couple of days. (Of forty-two patients treated with the oil thirty-seven were influenced in this manner, while in the seven others no influence upon the gonorrhœal process could be made out.)

2. If after ten to twelve days the medication with the oil is discontinued, the morbid symptoms reappear in an intensified manner.

3. The best results with the oil were obtained if it was not given before the third or fourth week, and if combined with weak astringent solutions (acetate or sulphocarbolate of zinc, resorcin). Three of such cases out of twenty-nine were cured in fourteen days without any injection; in twenty-one cases out of twenty-nine the secretion disappeared in eight to twelve days, the rest of the cure being accomplished with injections. The other eight cases were in indolent, degraded persons, who took not the slightest dietetic or hygienic precautions.

4. In cystitis and gonorrhœal prostatitis the oil has always proven of great value. In nine cases the drug decreased the duration of the affection and lessened the severity of the symptoms.

5. In chronic gonorrhœa the drug produced in many cases a distinct improvement, though its value in this affection is far inferior to the services it renders in acute gonorrhœa.

6. The oil is medicinally more active than oil of copaiba, though a great drawback, alongside of its high price, are the gastric and nephritic disturbances it is apt to create.

THE UNRECORDED INJURY FROM THE CONTINUED USE OF LARGE DOSES OF IRON.

There can be no doubt about the usefulness of large doses of iron in many different stages of disorders, and cases are on record in which 1 to 3 drachms, or even sometimes as much as 1½ to 2 ounces, of the tincture of iron have been given daily in erysipelas; so also ½ ounce of tincture of iron has been given daily to young children, followed by satisfactory results.

In anæmia, which is often dependent upon dyspepsia, the best and quickest way of curing both dyspepsia and anæmia is the administration of large doses of the chloride and sulphate of iron. Large doses of iron act as an immediate stimulant, rapidly removing anæmia, and removing gastro-intestinal catarrh, and renew the appetite and digestion; but if continued for more than a week or two they cause a gastro-intestinal catarrh of their own, and if this be not attended with diarrhœa, or if a purgative be not given, serious symptoms may ensue.

Dr. J. Strahan has had such an experience, and calls attention, in the *British Medical Journal* of September 18, 1886, to the danger of obstruction of the bowels which is apt to follow large doses of iron given for any length of time consecutively. The preparations which he has found to cause symptoms of obstruction are as follows, namely:

Ringer's pill of 5 grains of dried sulphate of iron, which equals 9 grains of the ordinary sulphate, ½-drachm and one-drachm doses of the tincture of mistura ferri composita P. B., made so strong as to contain 8 or 10 grains of sulphate of iron and carbonate of potassium in each dose. Any of these, if given three times, or even twice, daily, for from one to two weeks, and if natural or artificial diarrhœa do not in the mean time wash out the quantities of insoluble sulphide, will cause severe colic and constipation, which morphine and turpentine stupes seem unable even to alleviate, and which, it seems, would continue indefinitely, or till death, if not removed by a smart saline purge, or other means. Dr. Strahan has seen twenty-four hours of rhythmic agonizing pain, very like labor, with nearly constant vomiting, no sleep or ease after a grain of morphine by the mouth, the temperature rising to 101° Fahr., and great depression of all the powers of life, from a couple of weeks' course of Ringer's pill, which had done immense good to the system at large. This has not occurred once only, but dozens of times. As soon as ever a large dose of any saline—Dr. Strahan prefers an ounce of sulphate of magnesia—has well acted, all symptoms rapidly disappear. At this time, and for twenty-four hours after, the stools seemed composed half of dirty water and half of black sand. The author thinks this latter fact explains the pathology of the matter. In fact, it is a real obstruction—an acute one, too—by quantities of insoluble sulphide of iron. The quantity of this black sand, which comes away when severe constipation and colic have occurred, is surprising. It seems to be much more in quantity than the whole iron ingested, although the stools have been jet-black all along, through excreting the sulphide. So, it seems, it must lodge somewhere; perhaps in the cæcum and appendix. Then, when the iron begins to sicken the patient (gastric

catarrh), the sulphide concretes by mucus, and forms an obstruction which brings matters to a crisis. The length of time that a patient can take large doses of iron depends on the state of the bowels; if they be kept, or remain, slightly loose, he does not suffer at all; if he becomes constipated, the iron soon sickens, and the horrible pains begin; if he were to take a smart saline purge once a week, he could go on indefinitely. The saline gives the quickest relief, because it produces such a vast exosmosis of water from the intestinal wall at all points as to dissolve the mucus which binds the sand, and then washes it out. In extreme constipation, it dissolves fæcal lumps in the same way, except when the masses are enormous. It is thus the best purgative where there is a stricture in the bowels, with dilatation above, as it melts the fæces into a fluid, when they can run through the narrow part.

It is also well known to be the only safe purgative if any inflammatory lesion exist, enteritis or peritonitis. Mr. Lawson Tait takes advantage of this property of salines in his modern treatment of peritonitis ensuing on abdominal section. The principle here seems to be that of giving true and perfect physiological rest by dissolving and washing out all irritants.

Another great advantage the salines have is that they cause no pain, no griping. A teaspoonful of Epsom salts every two or three hours will put an end to many a case of fæcal obstruction in old people, and that without pain, where croton oil and drachm-doses of jalap have only given rise to unendurable pain and collapse.

It cannot, of course, be said that large doses of iron will affect every one in the way described, but in the nature of things it seems to be highly probable. There is excellent reason for the practice of giving large doses of iron. Laache, in "The Relation of Recent Researches on Blood-Corpuscles to Anæmia and Leukæmia" (*Deutsche Med. Woch.*, October 23, 1884), shows that in anæmia it may be both corpuscles and hæmoglobulin in proportionate quantity which are deficient, or, as in true chlorosis, while the red cells are diminished, the hæmoglobin is reduced out of all proportion to the loss of red cells. In fact, in the latter condition, what red cells remain are individually "chlorotic," are not red, or, at least, not red enough. Again, after bleeding, the red cells increase much more rapidly than the hæmoglobin, until, assuming it to be evenly distributed among the corpuscles, it has sunk to seventy per cent. of the healthy standard. Now, in such cases, the value of large doses of iron is seen. According to Laache, small doses of iron chiefly stimulate the numerical increase of red cells; large doses restore both the number of cells and the amount of hæmoglobin in each. This explains the difference which most men have noticed in practice between the large and the small dose.

URETHAN.

Urethan is the subject of an interesting paper contained in *La France Médicale* (September 14, 1886).

The experiences of UGHI and VAKULOWSKY confirm the conclusions already arrived at by Jaksch, Schmiedeberg, Huchard, Riegel, and other observers, and also correspond with the researches of Eloy in the laboratory of the Bichat Hospital as to the physiological action of the drug.

Urethan, according to these observers, preserves the respiratory functions in its full activity, but lessens the rectal and axillary temperature. Frequently it produces mental excitement. In doses from 6 to 10 drachms (90 to 150 grains) the drug occasionally produces gastric irritation.

In that it does not depress the heart it has an advantage over chloral, but as a pure hypnotic it is not so reliable (*Ann. di Chim. e di Farmacol.*, April, 1886). Vakulowsky prescribed urethan in delirium tremens, rheumatic pains, sleeplessness (cause not stated), and in gastralgia due to carcinoma. In none of these cases did he find it comparable with chloral. On the contrary, he found it to produce gastric troubles in three patients, headache, rigidity of the muscles, and finally a marked weakening of the heart impulse and frequency. These cases, says the editor (*Russkain Meditzina*, No. 14, p. 252), do not invalidate the claims of urethan, but they show the extreme variability of hypnotics.

THE USE OF BORACIC ACID WITH VAGINAL TAMPONS.

In the treatment of the various pelvic troubles where the use of tampons is indicated, one of the disadvantages has been the development of an extremely offensive odor, unpleasant to the physician and distressing to the patient, ordinarily occurring after a retention of the cotton for more than forty-eight hours. Occasions arise when it is inconvenient for the patient to return every two or

three days, and it then becomes a matter of importance to adopt some means which will prevent the usual decomposition and allow her to retain the tampon for a longer period.

To secure this end a number of expedients have been tried, of which DR. HARRIS A. SLOCUM (*Medical News*, October 23, 1886) especially recommends the use of boracic acid. From the first trial it has served the desired purpose effectually, and has given decided and striking results. Cases having profuse and offensive leucorrhœa among the Russians, Poles, and negroes of the Philadelphia Dispensary service have been subjected to this treatment, with the unvarying result of entirely preventing the occurrence of the usual unpleasant odor. In several instances the menses have appeared while the tampons were *in situ*, and have in each case saturated the cotton, which upon removal was found as free from smell as when introduced.

Following is a short description of the mode of application: While using Sims's speculum in either the genupectoral or lateral position, the vagina is cleansed with a piece of wet absorbent cotton held in a pair of uterus forceps, partly withdrawing the speculum to allow of access to the posterior wall. The membrane is then partly dried with a fresh piece of cotton, and several scruples of boracic acid introduced on a spatula, and distributed over the area with a wisp of cotton, or by the aid of the forefinger. The slight moisture permits the powder to adhere, forming a moderately thick coating over the entire wall. In an ointment-jar or other convenient receptacle is placed about an ounce of the acid, and each piece of cotton held in the forceps is thoroughly rubbed in it before insertion.

Great care is always necessary in the introduction of tampons, even when they remain but twenty-four hours, to prevent undue pressure upon the rectum or urethra. When they are to remain in position a week or longer, greater attention than ever must be paid to these points, on account of the tendency of the cotton to pack, through absorption of moisture and continuous pressure.

Comparing boracic acid with other agents, Dr. Slocum has not found one which so completely fulfils its office without offering objectionable features of its own. With very free or unpleasant discharges a proportionately larger amount of powder must be used.

Whether it affects the vaginal tissues advantageously or otherwise the writer is not prepared at present to say, though he has frequently noticed after its use, and when that which remained from the old packing had been removed with a piece of wet cotton, that the vagina was much paler than when the tampon was introduced. If by repeated trials this observation can be proved correct and constant, it may reasonably form the basis for a series of experiments in the treatment of vaginitis. That the paleness just mentioned is not entirely due to the mere pressure of the cotton seems evident from the fact that simple cotton tampons are frequently tinged with blood on their surface, although carefully placed and not tightly packed.

Oakum tampons seem particularly apt to irritate the membrane, and cause oozing after forty-eight hours' retention. So decided is this tendency to cause bleeding, that when a case presented where it was desired to use oakum, it was not introduced until a layer of cotton had been placed against the vaginal wall to protect it from the harsh and irritating fibres.

Cotton saturated with boroglyceride is an effectual antiseptic, but will not serve the purpose here. Glycerin produces a copious watery discharge, which, though at times beneficial, is not always desirable, and is ill adapted for long retention, inasmuch as it is diluted and partly removed by the watery discharge it causes.

NEW INVESTIGATIONS ON CHOLERA.

TIZZONI and CANTANI send to the *Centralblatt für Medizinischen Wissenschaften* (October, 1886) the valuable results of their observations and researches made during the recent epidemic of cholera at Bologna. The following theses represent their principal conclusions:

1. The nature of the disease was established by bacterioscopic and microscopic examinations.

2. The comma-bacilli obtained in a pure culture from the excrements and the intestinal contents of cholera patients presented all biological and morphological characteristics described by Koch and Van Ermenghem.

3. In twenty-four cases of cholera which were investigated the comma-bacilli could be demonstrated in each instance, either by microscopic researches or (in case the microbes were but few in number) by bacteriological procedures.

4. The bacillus was seen not only in the more or less acute form of cholera (twenty cases), but also in the prodromal diarrhœa (one case) and in choleric typhoid fever (three

cases). In the latter affection the bacillus was obtained as late as six, seven, and fifteen days after the beginning of the infection.

5. These observations testify to the signal value of bacteriological and microscopic researches for the diagnosis and prognosis of Asiatic cholera.

PEROXIDE OF HYDROGEN IN DISEASES OF THE EYE.

Much has recently been written in regard to the use of the peroxide of hydrogen in cases of purulent inflammation of the middle ear. Led by these statements, Dr. J. H. Claiborne (*New York Med. Journal*, September 11, 1886) instituted a number of experiments in cases of catarrhal inflammation of the conjunctiva.

On the instillation of two drops of a ten per cent. solution into the conjunctival sac in chronic catarrh, the following was observed:

The patient invariably started as the drops fell into the eye; that portion of the conjunctiva which was bathed in the drops became blanched and presented a "washed-out" appearance in from half a minute to one minute after instillation; this condition lasted at least five minutes; immediately after introduction the bulbar conjunctival vessels became constricted; this condition yielded to marked distention in a few minutes; bubbles rose to the surface of the fluid, and some remained clinging to the bottom and sides of the sac; twenty to twenty-five minutes after the instillation the eyes presented an irritated appearance, the bulbar vessels remaining still distended and the palpebral conjunctiva equally as red if not redder than before.

The patients complained irregularly of stinging immediately after the introduction, which lasted on an average from one minute to a minute and a quarter. Twenty to twenty-five minutes after the first instillation they invariably stated that their eyes felt better and more comfortable.

In acute cases the same was observed, save that the bulbar vessels became immediately distended after the instillation without apparently becoming smaller in half an hour. No exact difference can be drawn between the effect of a ten and a five per cent. solution, nor between these and a one per cent. solution, save that with the latter the stinging is less and usually lasts only half a minute.

Instillations were made also directly upon the cornea; there was no change in its appearance; the stinging was no greater, and no local anæsthesia occurred under half an hour's observation; there was no effect upon the pupil. The instillations were made every third day at the clinic.

The patients were instructed to use no other form of treatment; they invariably returned with the eyes in a less inflamed condition.

Encouraged by the ultimate result, Dr. Claiborne was bold enough to prescribe a five per cent. solution for one patient with acute follicular conjunctivitis, and to direct him to put two drops into each eye morning and night. He returned on the third day with the eyes much worse. He complained of severe stinging on the introduction of the drops, which, however, soon passed away.

The bulbar vessels were intensely congested and did not yield entirely to several drops of a four per cent. solution of cocaine.

In the light of the foregoing observations, the author does not feel justified in advising the using of the peroxide of hydrogen in eye-diseases, and, although no alarming reaction followed its use in any case, he gladly relegates to others its employment in the eye.

URETHAN AN ANTIDOTE TO STRYCHNINE, RESORCIN, AND PICROTOXINE.

Prof. Anrep has experimentally proven that urethan possesses properties antagonistic to convulsion-producing agents, such as strychnine, resorcin, and picrotoxine, and consequently claims that urethan could be utilized in intoxications caused by the named drugs. The efficacy of urethan rivals in this respect that of hydrate of chloral, but is far less dangerous, as it can, even in large doses, be given with perfect safety. Anrep concludes that in man 2 to 3 drachms of urethan would be required in order to counteract the intoxications with any of the foregoing drugs.—*Pharmac. Post*, October 23, 1886.

CODEINE IN DIABETES.

Notwithstanding the number of papers which have been published as to the value of codeine in the treatment of diabetes, this remedy appears to have made but little progress in the estimation of the profession at large. In the *Australasian Med. Gazette* (May, 1886) Dr. Alfred A. Lendon reports rather scanty notes of two cases of diabetes, one of which seemed to be a case of pure polyuria, in which the administration

of codeine, in doses of ¼ grain, produced immediate relief, decreasing the number of times in which micturition took place and the quantity of urine passed. The other was a case of diabetes mellitus, in a woman 85 years of age, in whom, after restriction in diet had failed to give any benefit, codeine in ⅓-grain doses was administered thrice daily, and the quantity gradually increased until she took four grains a day. After six weeks of this treatment, according to Dr. Lendon's notes, she was no better, but rather worse. The thirst was insatiable and the dryness of the mucous membrane of the mouth so great that she was unable to stick a stamp on a letter. The codeine was therefore left off for a time, and after a week resumed at her urgent request, as she fancied that she missed its narcotic effects. It was then given in 3-grain doses at night, and soon increased to 5 at night and to 1 grain in the morning, with marked results, the sugar becoming much less than before, only a trace remaining. The mouth and pharynx became moist and the skin moist instead of harsh and dry. The thirst was no longer a source of complaint, and at night she rested well. She died at the commencement of the hot weather from an attack of acute diarrhœa.

While these notes are quite meagre, they seem to show that codeine possesses a certain amount of influence in preventing the formation of sugar in diabetes mellitus and in controlling the quantity of urine secreted in diabetes insipidus. The results obtained at Dr. Lendon's hands, taken together with the claims made for codeine by Drs. Pavy and Shingleton Smith, show that codeine as a remedy in diabetes is well worthy of further study.

THE ANTAGONISM BETWEEN STRYCHNINE AND COCAINE.

Dr. Bignon (of Lima) communicates to the *Bulletin Général de Thérapeutique* (October 30, 1886) the following results of his experiments on dogs, made in order to define the alleged antagonism between strychnine and cocaine:

1. Cocaine is a physiological antagonist to strychnine.

2. A dog having ingested about $\frac{1}{120}$ grain of strychnine per pound of bodily weight can always be saved by hypodermic injections of cocaine.

3. This experiment succeeds even after the first tetanic paroxysm has set in.

4. Only if too large doses of strychnine have been ingested the dog perishes from the correspondingly large doses of cocaine required.

THE HYPODERMIC USE OF SPIRITS OF TURPENTINE IN MALIGNANT TUMORS AND OTHER STRUCTURAL DEGENERATIONS.

We have already referred in a previous issue to the favorable results obtained through the hypodermic injection of turpentine in malignant tumors, in the hands of several European surgeons. Dr. J. McF. Gaston reports in the *Southern California Practitioner* for September, 1886, his experience with the injection of undiluted spirits of turpentine in a case of nodular induration and ulceration of tissues that had resisted all the ordinary modes of procedure in such affections. The disease had commenced about five years before, with a thickening and induration of a nodular form, involving all the elements which make up the skin, and, to some extent, the subcutaneous cellular tissue of the lower third of the affected leg. When it was first brought to his attention it did not extend entirely around the leg, and there were only a few points in which ulceration had occurred. But ultimately the tissues became involved throughout an area that could not be covered by two large hands embracing this part of the leg, and broke down into irregular cavernous excavations, interspersed with nodular masses, having an icherous exudation from the ulcerated apertures that studded the entire surface. The boundary above and below the affected tissue presented a serrated outline, with the structure of the skin unchanged beyond this border-line, and the general nutrition of the body remained apparently unimproved. It may be mentioned that the other leg was amputated below the knee a number of years ago on account of an injury, and that the stump presents nothing worthy of comment.

While nothing definite can be inferred in this case, owing to the interruption of the treatment, there are some points of interest connected with the use of the hypodermic injection of the spirits of turpentine which warrant a reprint of the facts.

An ordinary hypodermic syringe being filled with spirits of turpentine, the point was thrust into the affected tissues and the contents forced into the diseased part. Most intense suffering followed this application, and Dr. McGaston proceeded to inject into the sound structure elsewhere a solution of ¼

grain of sulph. morph. and $\frac{1}{60}$ grain of atropine, giving also internally alcoholic stimulants freely. The contortions of the features and the spasmodic respiration resembled the disturbances from an attack of angina pectoris, while the acceleration of the pulse, with marked diminution of its force, indicated serious interference with the vital powers of the patient. In the course of an hour the constitutional trouble passed, and there was slight febrile excitement afterwards. The local irritation and inflammation was controlled by poultices of flaxseed-meal for two or three days, and ultimately disintegration of the deep structures ensued, with a filling up by healthy granulations in this vicinity.

After several weeks another application was preceded by an injection of morphine and atropine. The patient still gave indications of much pain, and seemed to require the repetition of the whiskey in liberal doses. Again the influence upon the new zone of tissue, permeated by the spirits of turpentine, underwent such a modification as to encourage a continuation of the injections.

On the third occasion, however, a four per cent. solution of cocaine was first injected into the part selected for operation. Allowing the needle to remain *in situ*, while the body of the syringe was removed and filled with turpentine, this was now injected without complaint for the time being. But after a half-hour had elapsed the patient began to complain of local pains, which continued for some hours, and caused the refusal of the patient to submit to any further treatment.

SUPERALIMENTATION.

DUJARDIN-BEAUMETZ has made certain deductions from his study of obesity which bear directly upon the question of fattening.

He defines a properly fattening diet as comprising nitrogeneous, starchy, and fatty elements, with an abundance of fluid. Such a regimen may be used as a definite mode of treatment in all conditions of general depression, and also in phthisis.

It must be used under the three conditions which the study of animals has shown necessary to fatten,—namely, consideration of the peculiarities of race, "stalling" (a limited exercise), and a special selection of foods. These conditions are, of course, modified in their application to the human subject.

Practically, as many obese persons eat too little, so many emaciated patients eat too much. There are cases which cannot be successfully treated through some constitutional peculiarity.

The author speaks of *forced feeding*, as with the insane, and feeding by other than the natural channel, as in cases of stomach intolerance of food.—*Journal d'Hygiène*, November 25, 1886.

THE EFFECTS OF AN OVERDOSE OF COCAINE.

DR. W. E. RAMSDEN WOOD records in the *Australasian Medical Gazette* for August, 1886, the account of a patient in whom an overdose of cocaine produced some alarming symptoms of poisoning. The case was that of a man in whom an injection of three drops of a ten per cent. solution of cocaine was administered to reduce the pain of neuralgia from a diseased tooth, since chloroform was counterindicated on account of heart-disease, and ether proved so exciting that its use had to be abandoned. The next day, the pain being very severe, he sent to his chemist for a similar solution, and had three minims injected, but without the desired effect; he returned to the chemist to make it stronger, which he did, making it twenty per cent. On visiting Dr. Wood, he again received four minims of the twenty per cent. solution, and within five minutes he became restless and inclined to vomit, and then began to feel the sensation of pins and needles in the left hand and arm, which rapidly extended to the right side. This was speedily followed by contraction and rigidity of the fingers, arms, and legs. There was also a tendency to opisthotonos. His pulse became extremely rapid and feeble, his face livid, and the muscles of his mouth and cheek strongly contracted. His respirations were short and convulsive; his hands and feet became cold, and a profuse perspiration broke out on his head and face. Half a tumbler of brandy was administered, followed at short intervals by drachm doses of aromatic spirits of ammonia, and a mustard-plaster was applied over the cardiac region and friction was used upon the upper and lower extremities. At the same time he was made to inhale a few drops of chloroform to check the spasmodic contractions. After continuing these frictions for over an hour he improved somewhat, and the rigidity of the muscles lessened, but returned as soon as friction was stopped. At the end of two hours he improved more rapidly, but felt somewhat

drowsy, and it was not until about four or five hours that all the symptoms had subsided.

THE PHARMACEUTICAL USES OF SACCHARIN.

There seems to be good reason for believing that saccharin has no injurious physiological action when taken internally.

Sir Henry Roscoe has stated that large quantities have been given to dogs, and one dog had as much fed to him daily as was equivalent in sweetening power to a pound of sugar, and did him no harm. Up to the present time it has not been known to produce any injurious effect upon the system, and will therefore probably be more employed in pharmacy. MR. C. J. S. THOMSON, of Manchester, publishes in the *Pharmaceutical Journal* for October 23, 1886, the following notes of some rough experiments made with a view of ascertaining how far the new sweetening principle (saccharin) may be of use in this way. He finds that one per cent. solution of saccharin in hot water, although very sweet to the taste, has a flavor distinctly different from that of cane-sugar. Ninety minims of this solution added to one containing four grains of sulphate of quinine quite masked the bitter taste of the alkaloid and rendered it palatable.

Thirty minims of the same solution sweetened half a drachm of tincture of iron, and it required twenty minims to cover the salty taste of ten grains of bromide of potassium.

BICHLORIDE OF MERCURY IN DIPHTHERIA.

During an epidemic among the population near the Gulf of Finland, where diphtheria has long been extremely fatal, the following treatment, in the hands of DR. VERNER, was very successful.

For young children he dissolved ¼ grain of bichloride in 5 ounces of water; for older children, ⅓ grain in 7 ounces of water; for adults, ¾ grain in 16 ounces of water.

These quantities are to be taken by the different patients in from twenty to twenty-four hours, in convenient doses and at convenient intervals. Milk diet only is allowed. Antipyrin is the antipyretic used, and inunctions of ichthyol are ordered three or four times daily. Antipyretics are given in enemata, and the digestion is as carefully conserved as possible.

The author's only bad results in seventeen cases were two, in which scarlatina was a complication.—*Le Nouveaux Remèdes*, No. 19, 1886.

THE MOVEMENTS OF THE HEART AND INTESTINES, ILLUSTRATED BY PHOTOGRAPHY.

At a recent meeting of the New York Academy of Medicine (*N. Y. Med. Journ.*, November 13, 1886), DR. WILLIAM GILMAN THOMPSON exhibited photographs of the normal pulsating heart at the various periods of the pulsation in rabbits, kittens, lizards, pigeons, etc. He also exhibited photographs exhibiting modifications in the movements of the heart consequent upon the administration of various stimuli. In this way he was able to give graphical illustrations of the effects of drugs upon the heart. He had at first employed an ordinary camera, but, as only one plate could be used at a time, he had constructed an apparatus by which he could take six views of the object within a second. The shape of the heart varied very considerably in different animals, but in general the longitudinal diameter exceeded the transverse by about one-fourth in full diastole. The modifications in the form of the heart depended chiefly upon the thick-walled left ventricle. In the open chest the movements of the heart were greatly exaggerated by artificial respiration; if artificial respiration was not maintained the movements might be diminished.

The most important of his later observations were as follows: 1. The base of the heart descended very little, if at all, in systole in most animals. A prominent exception to this rule was seen in the frog. 2. There was much discussion among physiologists as to whether the long diameter was shortened to any appreciable extent in passing from full diastole to full systole. The photographs showed much variation in this matter, and we could hardly judge from what took place in animals as to what took place in the human subject. In most animals there was a slight shortening, but in pigeons there was slight elongation. The transverse diameter was shortened usually twice as much as the longitudinal diameter in full systole. The average shortening of this diameter amounted to from one-quarter to one-third. It was uniform from base to apex, unless interfered with by drugs. The antero-posterior diameter was uniformly elongated by about one-eighth. In a given heart this

diameter was elongated about half as much as the transverse diameter was shortened during systole. 3. The apex, when the pericardium was removed, in birds and mammals, was uniformly tilted forward, upward, and to the right, and the rotary movement of the heart from left to right on its long axis occurred in the excised heart as well as in the heart *in situ;* in other words, it occurred when the base of the heart was free, without vessels to offer resistance to it. 4. The right ventricle lay so much higher, and it was so much thinner-walled than the left, that it exerted much less influence on the shape of the heart during its movements, especially at the apex. The author inferred from his experiments that the cardiac impulse against the chest-wall might be due to the stroke of the apex, and perhaps also partly to the stroke of the anterior and hardened ventricular wall just above the apex.

The apex, as well as the whole contour of the heart, was greatly modified by drugs. Drugs which had the primary effect of increasing the systolic force tended to make the apex sharper, whereas drugs of which the action was to lengthen the diastole, tended to make the apex blunt and round. If antagonistic drugs were given, the whole contour of the heart became more rounded than was natural. The surface of the heart in all its normal changes in size between full diastole and full systole was smooth, but stimulants caused it to become more or less irregular. When the heart was deprived of its blood by hemorrhage, the thick left ventricle retained its shape pretty well, but if the heart was held up, the right ventricle would be seen to pouch out below. The apparent greater vitality of the right side of the heart was observed in the feeble efforts to beat after the left ventricle had ceased its movements. The auricles in systole were uniformly contracted to a slight degree. The independence of the auricles and ventricles of each other in contraction was shown by the photographs. The auricular systole overlapped the ventricular systole in point of time. The extent of movement of the heart as a whole bore no definite relation to its size, but depended altogether upon the amount of work being done. The heart, being removed from its attachments and emptied, filled itself by suction when placed in fluid, and assumed a rounded form. It had been a question whether the coronary arteries were filled during systole, or whether they were closed during systole by the cusps of the valves. If the latter was the case, these arteries must be filled during ventricular diastole by the elastic recoil of the aorta. The very great prominence of the vessels in the photographs showed that the blood-flow was impeded and dammed back in the superficial vessels by the pressure of the strongly-contracted ventricles. If now, as had been shown by experiments, the coronary arteries were divided during systole, the blood would spurt with some force. The conclusion arrived at by Dr. Thompson was that the coronary arteries were filled by the recoil of blood during diastole, and perhaps also to some extent during systole. By dividing the longitudinal and spiral muscular fibres the contraction of the circular fibres was shown to be uniform and symmetrical. The papillary fibres were shown to stand out towards the centre of the heart and to have independent contractile power. Of the various cardiac stimulants which he had employed, heat produced the strongest systole, and was most uniform in its effect. With aconite he paralyzed the right ventricle, while the left retained its power to contract. Glonoin appeared to be the most powerful chemical cardiac stimulant. Chloral caused marked diastole.

Dr. Thompson had also been successful in photographing the movements of the intestines, bladder, and diaphragm. Scratching the large intestine caused it to contract in ridges, which did not extend far from the point of irritation. The effect of the contraction was to shorten and draw up the entire loop. It was a disputed point as to whether the peristaltic wave passed normally in the reverse direction from the anus up. He had photographed peristaltic waves passing simultaneously in opposite directions; also the pendulum movement of the intestine. Pricking the intestine caused a stricture-like form of contraction.

Dr. A. H. Smith asked whether it was not probable that a systolic murmur was sometimes mistaken for a presystolic one, the observer dating the commencement of the systole from the stroke of the heart against the chest-wall.

Dr. Thompson did not doubt that systole began before the stroke of the heart against the chest-wall, and consequently such an error in diagnosis might occur.

LIQUOR FERRI ALBUMINATI.

Dr. Gempt has used this solution, originally introduced by Biel, of St. Petersburg, as fol-

lows: in doses of ½ to 1 dessertspoonful, three times daily, in milk; to children, from 5 to 30 drops. Constipation is remedied by Carlsbad salts, taken after the morning dose. This preparation mixes well with milk, containing one-half of one per cent. of oxide of iron.

It is recommended especially in gastric ulcer, and given very recently in hemorrhage. The author gives the following formula for a preparation which will not coagulate milk:

Dried egg albumen, ℥i;
Aquæ dest. (cold), ℥vi.

Add to the following solution, and shake well:

Liq. ferri sesquichlor., ℈viii;
Cinnamon water, ℥iss;
Glycerin, ℥iss.

Filter. The liquor should be clear, reddish-brown, and contain five per cent. of oxide of iron. Specific gravity, 1.06. Mixed with an equal value of saturated solution of sodium chloride, the albuminate of iron is completely separated. The filtrate should give only a weak reaction for iron.—*Zeitschrift des Österreich. Apotheker-Vereins*, November 10, 1886.

UNALTERABLE ALKALOID SOLUTIONS.

Solutions of cocaine, as those of morphine, atropine, and some other alkaloids, when made with simple distilled water, rapidly become spoiled through the growth of a fungus. Dr. Abbott (*Medical Press*, October 13, 1886) recommends a solution in camphor-water. He has kept solutions of atropine to which camphor (one grain to the ounce) was added for over a year, and has not seen any micro-organisms develop. The salicylate of these alkaloids has been demonstrated by Mr. Tichborne, of Dublin, to be free from the objection referred to by Dr. Abbott. Their solutions are non-irritant and free from fungoid growths.

CANNABIS INDICA AND BELLADONNA IN WHOOPING-COUGH.

The following formula has been a favorite one with Vetlesen:

℞ Ext. cannabis indicæ, grs. xv;
Ext. belladonnæ, grs. viiss;
Alcohol absolute,
Glycerin, āā ℥iss.

In the following doses: Children aged from 8 months to 1 year, 4 to 5 drops; 1 year to 2 years, 5 to 8 drops; 2 years to 4 years, 8 to 12 drops; 4 years to 8 years, 10 to 13 drops; 8 years to 12 years, 12 to 15 drops; over 12 years, 15 to 20 drops.

116 cases were treated, of which 83 did well; of these, 30 made most brilliant recoveries. No evil after-effects were observed in any case.—*Pharmaceutische Centralhalle*, November 11, 1886.

CHLORAL HYDRATE AS A VESICANT.

Attention has quite recently been called to the fact that, for blistering purposes, chloral hydrate is fully as efficacious as cantharides, while it is free from the inconveniences attending the employment of this latter agent. The chloral should be reduced to a powder, and a layer of it placed on a piece of common adhesive plaster, taking care to leave a margin between the edge of the layer of chloral and that of the plaster. This is then warmed over a gas-jet until the chloral becomes discolored and melts, when it should be immediately applied on the spot for the operation, the skin covering which is to be anointed beforehand with olive oil or lard. The anæsthetic properties of the chloral prevent any unpleasant sensation, and fifteen minutes is the maximum period of time during which the application may be continued. If the above-mentioned precaution be taken of anointing the skin, its vitality is retained, and the presence of an open wound is avoided, the skin adhering again as soon as the exudation is evacuated. Another advantage consists in the absence of the risk of poisonous effects consequent on absorption, a by no means uncommon sequel to the use of cantharides. —*Medical Press*, October 13, 1886.

TREATMENT BY INTESTINAL INJECTIONS OF GAS.

Cornil and Claude Bernard have drawn the attention of the French Academy to the fact that gases given by rectal injection pass into the lungs and are expired. Carbonic acid gas may be used as a vehicle, and impregnated with medicinal agents.

Bergeon, of Lyons, has given sulphurous acid gas for a chronic bronchitis with most happy results. Chanteron has treated asthmatic and phthisical patients by this method with sulpho-carbonated gas with a direct benefit to respiration; the effect followed half an hour after injection.

In the phthisical a rapid gain in weight occurred. Bergeon recommends 8 to 10 pints of carbonic acid, and from 7 to 10 ounces of sulphur, containing material to be injected slowly into the rectum twice in twenty-four hours.—*Wiener Medizinische Blätter*, November 11, 1886.

THE CAUSES OF THE POISONOUS EFFECTS OF CHLORIC SALTS.

Stokvis (in Amsterdam) has studied the phenomena produced by large doses of chlorates, and his conclusions are of especial interest in the light of the reported accidents, especially in practice among children, which have occurred with these drugs.

The commonly received explanation for the toxic effects has been twofold, especially with potassium chlorate: first, the local action of its liberated acid radical, and, second, when taken in large doses and entering the blood, through oxidation of the hæmoglobin to methæmoglobin. Stokvis and Von Mering gave animals large doses of chlorates other than potassium to eliminate the influence of that metal. Almost the given amounts appeared in the urine, while there was also an appearance of salts of a lower acid radical. Experiments with potassium salts also showed that salts undergo a reduction in the organism. The reduction of the chlorates, however, was not effected by fibrin, blood-serum, sugar, pus, or the excretions of the body, while these constituents were themselves free from decomposition. Especially was this true of blood and urine.

Jäderholms, Marchand, Mering, and Stokvis have shown that the oxidation of the blood from hæmoglobin to methæmoglobin does not occur without the decomposition of the blood, their studies of blood temperature and other phenomena causing them to consider the process essentially a fermentation. These investigators consider it very doubtful if such oxidation can occur in circulating blood. Injections—intravascular and subcutaneous—of chlorates do not result in the finding of methæmoglobin in the blood in the living animal. In blood drawn from the animal, evidences of the presence of these substances were not wanting. After the administration of large doses to dogs hæmiglobinuria and methæmiglobinuria were only observed when an overpowering intoxication followed. With rabbits, however, both these phenomena occurred, but with evidences of hemorrhage and engorgement of the kidney parenchyma, and the decomposition of such extravasated blood would readily account for methæmoglobin in the urine. We see, then, how all salts, when circulating in a given concentration, can produce derangement in the relative composition of the body fluids, the decomposition of these fluids, local engorgements, injury to the tissues, and finally the changes which the presence of fermentation makes possible. The author considers not potassium chlorate alone, but all salts, and especially all the potassium salts, capable of such action.

AN IMPROVED TROCAR FOR PARACENTESIS OF THE ABDOMEN.

The frequent obstruction of the canula by the intestine or omentum in the operation of tapping, which generally occurs when about a pint of fluid has been withdrawn, renders the improvement in the form of canula suggested by Dr. John S. Miller (*Annals of Surgery*, November, 1886) of considerable value, especially since the various manœuvres usually resorted to, such as endeavoring to float away the obstruction by changing the patient's position, or the dangerous plan of introducing a probe through the canula, are generally without success.

The device which Dr. Miller employs is to introduce a smaller and longer canula into that already in position, in case there is an obstruction to the flow. The canula is blunt, and provided with two long fenestræ. In the latter are springs which expand and push away the obstruction on emerging from the original canula, and which are so solidly soldered as to offer no danger of breaking off in the abdominal cavity.

In reply to the query whether or not the gut may be incarcerated and wounded by the springs, Dr. Miller states that in several operations no such accident occurred, when all efforts in bringing about such a complication upon the recent cadaver were unsuccessful.

THE EFFECT OF LARGE DOSES OF COCAINE UPON THE CENTRAL NERVOUS SYSTEM.

Dr. Bey, of Cairo, has had the following experience in the use of cocaine as a means of checking the opium-habit. He began with doses of 5 centigrammes, three or four times daily, but the patient's sensations of relief and stimulation were so pleasurable that the patient soon established a cocaine-habit. He sought relief for each slight ailment in an

injection of cocaine, the dose increasing until ½ a gramme, and even $\frac{8}{10}$ of a gramme, was taken secretly daily. This produced loss of appetite, great irritability, ringing in the ears, and, from time to time, dyspnœa and hallucinations of sight and hearing. These unpleasant symptoms the patient had learned to relieve by injections of morphine until he became skilled in the antagonistic use of the drugs. An attack of herpes and its neuralgic pains drove him to double his doses of cocaine until for two or three days he took a gramme, and at times 1½ grammes daily. Then followed a condition very like delirium tremens, —tremors, lack of muscular tonicity, incontinence of urine, alterations in the nails of the fingers and toes, the greatest agitation, severe hallucinations of sight, hearing, and smell, injected conjunctivæ, a staring expression. He fired a pistol at imaginary objects, attacked his servant, and was finally placed under hospital restraint. Here he soon recovered under morphine injections of 5 centigrammes, three times daily.

RARE LESIONS PRODUCED BY BROMIDE OF POTASSIUM.

At a recent meeting of the New York Pathological Society (*N. Y. Med. Journ.*, November 13, 1886) Dr. R. W. Amidon presented an epileptic young woman, who had been under his care four years, taking moderate doses of bromide of potassium,— perhaps never more than 4 or 5 drachms a day. A little over a year ago she discontinued it, but recently he learned that she had been taking during the past eighteen months a mixture of the bromides amounting to 6 drachms a day. She then returned to him, and he found the ordinary acne on the face, which, although usually confined to the face and neck, perhaps occasionally reaching to the chest and shoulders, had in this patient, as in two others whom he had seen, invaded the legs, and assumed almost the pustular form. The lesion began in the ordinary way, but became indurated with rather a large base, and ran a chronic course, breaking down and forming what appeared to be a small ulcer. Vesicles, with contents which tended to become cloudy and purulent, formed in rings about the acne spot. After a time the centre of the spot took on a reparative process, and entirely healed, while the pathological changes at the periphery spread, and the vesicles became purulent, dried up, and formed a brownish scab. A section of one of these spots showed that there had not been a true ulcer, but that the skin had simply been denuded of the cuticle, leaving the papillæ intact. He had in no case seen the true skin indurated. The disease did not seem to depend particularly upon the amount of the bromides given. The only treatment which he had seen do good was the thorough application of the actual cautery.

NEW HÆMOSTATICS.

Bonafoux recommends the following powder, whose use in the human subject and in experiments on animals has resulted in the prompt checking of bleeding, and the rapid obliteration of the vessel afterwards:

Colophonium,
Gum-arabic,
Charcoal, in equal parts.

Dr. Spark has used in his operations about the mouth and throat chloroform and water, in proportion of two to one hundred.

As a simple gargle, especially after the removal of tonsils, it has been very satisfactory. As a hæmostatic douche, it acts promptly, and does not impede the work of the operator.— *Pharmaceutische Post*, October 30, 1886.

NOTE ON THE TREATMENT OF THREAD-WORMS IN CHILDREN.

The complete cure of thread-worms in children is often very difficult. While the ordinary methods used, such as rectal injections of salt and water, infusion of quassia, and other remedies, do good for a time, yet they often fail to relieve the attendant symptoms of "worms," symptoms usually very irregular, and in some cases severe, in character. In many cases, though the irritation about the anus is relieved by injections, the irregularity of the bowels and the disturbance of sleep remain the same. This is probably due to the fact that the habitat of the worms is higher up in the large intestine, where no remedy introduced by the rectum can reach them.

In many cases Dr Sidney Martin (*Practitioner*, October, 1886) claims to have found that rhubarb in small doses brings away large numbers of worms, and at the same time regulates the bowels, so that the use of injections may in most cases be dispensed with. The formula which he has found most useful is as follows, varying slightly with the age of the child:

℞ Tincturæ rhei, ♏iii;
Magnesii carbonatis, gr. iii;
Tincturæ Zingiberis, ♏i;
Aquam, ad ℥i.

This is to be taken twice or three times daily, according to the effect on the bowels. Whether the rhubarb acts as a vermicide, or simply by "moving the worms on," the writer is unable to say.

INFLUENCE OF DRUGS GIVEN TO NURSES OR MOTHERS ON THEIR SUCKLING INFANTS.

We abstract from *Les Nouveaux Remèdes* of August 1, 1886, the following interesting discussion of DR. FEHLING relating to the influence of certain drugs given to nurses on their suckling babies.

1. *Salicylate of Sodium.*—Dose varying between 30 and 45 grains. Whenever the child is put to the breast one hour or less after the administration of the drug, the salicylate of sodium can be found in the child's urine. After the expiration of twenty-four hours no traces of it can be found in the urine. Likewise the salt cannot be recovered if the child is put to the breast very soon after the exhibition of the drug. The elimination of the drug terminates simultaneously in nurse and child.

2. *Iodide of Potassium.*—The same results are obtainable. The milk, if analyzed, gives the characteristic reaction. In the child the elimination lasts seventy-two hours; in the nurse forty-four hours.

3. *Ferrocyanide of Potassium.*—The reaction is very distinct in the urine of the nurse, but wholly absent in the child's urine.

4. *Iodoform.*—After prolonged application of iodoform upon wounds of the vagina or vulva, iodine can be recovered from the milk and urine of the nurse, but never from the child's urine.

5. *Mercury.*—The transmission of mercury from the nurse to the mother is very slight and inconstant.

6. The influence of the nurse's diet on the child is illusory; nurses can with impunity eat sour articles (lemons, vinegar) without thereby influencing the child.

7. *Narcotics.*—(*a*) Tincture of opium in 20- to 25-drop doses. Thornhill claims to have observed a prolongation of the sleep in infants, while Fehling saw neither prolongation of sleep nor constipation resulting from it. (*b*) Hydrochlorate of morphine. The drug given in medicinal doses does not influence the child. (*c*) Chloral. Dose 15 to 45 grains. Average length of sleep produced in nurse, two hours. No effects on the child are observable if it is strong and vigorous. If the child is weak and possibly born before the full term, it is advisable to wait two hours after administration of the drug to the nurse before allowing it to suckle. (*a*) Sulphate of atropine. Injected in the usual doses hypodermically in the nurse, the drug produces very distinct physiological effects in the child. The dilatation of the pupils taking place in the child does not disappear before twenty-four hours. Hence minute doses of the drug exclusively are permissible.

MILK AS A PROPHYLACTIC AGAINST RENAL ALBUMINURIA IN PATIENTS WITH SCARLATINA.

MUSATTI has combined milk diet and cold baths in scarlatina, with the best results both in mitigating the severity of the fever and in preventing the nephritis which so often occurs. He employs milk from the beginning of the disease, and he has not seen the evil effects of cold bathing in causing renal congestion and irritation, of which others have spoken. With due care against shock and collapse, he would repeat the cold application every two hours if needed. Jaccoud is quoted as supporting the author's use of milk.

HYDRASTIS CANADENSIS NOT AN OXYTOCIC IN THE HUMAN SUBJECT.

SCHATZ has reviewed the experiments of Fellner upon animals, and has observed the effects of the drug upon human beings, without finding the markedly oxytocic effects seen in animals. The peristalsis of the genital tract seen in animals Schatz considers due to the strongly-contracted blood-vessels, and not to muscular stimulation. The peculiar property of the hydrastis to contract the uterine blood-vessels, but not its muscle, makes its use indicated in the following cases: in uterine hemorrhage from myomata; in an eccentrically hypertrophied uterus, which, when emptied of its contents, relaxes, and bleeding recurs; in hyperæmia of the genitalia, where ergot does not result in contraction, and intermittent pains and relaxation increase the hyperæmia; in acute or chronic pyosulpinx, where it is desirable to contract the tube to lessen hyperæmia; in chronic peritonitis and oöphoritis. Hydrastis does not derange digestion as digitalis does.—*Medicinisch-Chirurgische Rundschau*, November 15, 1886.

METHYLAL.

Attention has been called by SIGNOR PERSONALI (*Nouv. Rem.*, October 15, p. 459), of the Pharmacological Institute of Turin, to the possible value as an anæsthetic and hypnotic of methylal, a compound which was first obtained nearly half a century ago, but has hitherto remained without application. Methylal is represented by Roscoe and Schorlemmer ("Hist. Carb. Comp.," p. 195) as having probably the constitution $CH_2(OCH_3)_2$. It is prepared by distilling methyl alcohol with an oxidizing mixture of manganese dioxide and sulphuric acid, and treating the distillate with potash lye to separate methyl formate, which passes over with the methylal. The methylal is a very mobile, volatile, colorless liquid, sp. gr. 0.3551, boiling at 42° C., and slightly reddening litmus-paper. It has an odor recalling those of chloroform and acetic ether, and a burning aromatic taste, but produces a sensation of cold when placed on the skin. When injected subcutaneously into dogs in the proportion of 0.10 to 0.15 per cent. of their weight it quickly produced anæsthesia, followed by a deep sleep, in which reflex action was suspended. Rabbits were not quite so susceptible. Recovery was rapid in consequence of the rapid elimination of the methylal, which did not appear to leave any disagreeable after-effects. It augmented slightly the heart-beats, lowered slightly the blood-pressure, and caused the respiration to become slower and deeper. Signor Personali has found methylal also to be an antidote to strychnine, a small quantity being sufficient to suspend the tetanic spasms. In the human subject it is said to relieve nervous pains of the stomach when administered as a draught, and in the form of an ointment or liniment to constitute an excellent anæsthetic. Several formulæ are given, among which are a liniment (oil of almonds, 35 grammes; methylal, 15 gr.), an ointment (lard, 30 gr.; wax, 3 gr.; methylal, 5 gr.), a "potion" (syrup of red currants, 40 gr.; methylal, 1 gr.; water, 110 gr.), and a syrup (methylal, 1.5 gr.; simple syrup, 100 gr.).—*The Pharmaceutical Journal and Transactions*, October 30, 1886.

THE PHYSIOLOGICAL ACTION OF ACETOPHENONE.

DR. MAGNIAN denies the hypnotic effects which others have ascribed to this drug.

The author gave an animal a toxic dose, with the following effects: lessening of arterial tension, acceleration of pulse and respiration, which became slow as the stage of intoxication became advanced.

No great alterations were observed in the gases of the blood; the amount of oxygen especially is not lessened, while the amount of urea excreted is greatly lessened.—*Revue de Médecine*, November 10, 1886.

USES OF HYOSCYAMINE.

An interesting discussion took place before the meeting of the New York Neurological Society on October 5, which we reproduce as reported by the *New York Medical Journal* of November 13, 1886:

The president, DR. C. L. DANA, stated that there were two preparations of the drug, the crystalline and the amorphous. The former seemed to be similar in property to the opiates, while the latter seemed to have neurotic properties. He had heard that hyoscyamine was employed in the asylums for the insane in New York, but not very successfully; whereas in the asylums of Pennsylvania its success had been marked. He had employed hyoscyamine in paralysis agitans, in chorea, and in a few cases as a hypnotic, and it had been employed as a hypnotic to a considerable extent in his service at Bellevue Hospital. The number of cases of chorea in which he had used it was six; in three it was noted to have been of benefit, or to have caused very rapid or very marked improvement. One of the cases was marked, and had not yielded to other treatment. In three cases the results were very doubtful. He had employed it in four cases of paralysis agitans,—in two, he thought, with unquestionable benefit. In two it seemed to produce no benefit. On the whole, he thought that, unless given at rather an early stage of paralysis agitans, it did no good. The form employed in chorea and paralysis agitans was the crystalline, but he was not sure that the amorphous form would not be the better preparation in such cases. He thought we could get along perhaps as well without as with hyoscyamine.

DR. B. SACHS'S experience with hyoscyamine had not been very extensive, but he had employed it in a few cases of paralysis agitans, acute mania, and the insomnia accompanying the neurasthenic condition. He had employed only the crystalline form. In contradistinction to what the president had said, that it was best to give it in the early stage of

paralysis agitans, he remembered one case in which every other therapeutic agent had been tried without success, when hyoscyamine was administered in about $\frac{1}{100}$ of a grain doses twice a day, with the effect of making the patient very much more comfortable, and of diminishing somewhat the annoying movements of the hand. In another chronic case it had been of no benefit. He had obtained no effect from the drug in allaying the excitement of acute mania. It had also been disappointing in insomnia accompanying neurasthenia. It seemed to be of more value against insomnia from mental restlessness.

DR. W. M. LESZYNSKY said that about eight years ago it was quite fashionable to use hyoscyamine in asylum practice, and he had employed it in chronic mania, acute mania, and epileptic forms of insanity. First he used the amorphous form, and afterwards the sulphate. It had been said that the latter form was easier absorbed, and produced its effects in smaller doses. The sulphate was also preferred for hypodermic use, in which manner he had employed it in $\frac{1}{60}$ of a grain doses. To patients with recurring attacks of maniacal symptoms the drug was given a few days before an expected attack, and continued until the attack was aborted. In a state of exhaustion he would regard hyoscyamine as a dangerous drug to administer; but where there was no objection to its use on that ground, he had known it to produce sleep where chloral and morphine had failed. Given to patients subject to epileptoid convulsions before menstruation, it had seemed to avert the attack. He had given it in small doses in two or three cases of chorea, and thought it produced some benefit.

DR. GRAY had been using hyoscyamine ever since it had been introduced to the profession, and he must say that for certain purposes there was no drug that he could not better afford to dispense with. The most convenient form was in tablets, $\frac{1}{100}$ of a grain each. In some people hyoscyamine would produce seemingly serious retention of urine. It might also produce disastrous results if given to persons whose general strength was below par. In an old gentleman with atheromatous arteries, hypertrophied and feeble heart, $\frac{1}{100}$ of a grain had caused a condition of collapse. He knew of one patient suffering with melancholia whose death had been hastened by it. He had given it in two cases of chorea, one being an exceedingly violent case. The child finally died in a convulsion. To that patient he could never give a second dose of hyoscyamine, because of the alarming prostration which a first dose would cause. In another case, in which the child had to be held in bed, the drug proved an effective means of restraint, but the child was always found prostrated to a marked degree the next day. In paralysis agitans it had been very useful, and its use had come to be with him a routine treatment. He thought the reason why it had been of more benefit in his practice was that he combined with it some stimulant or tonic to prevent its depressing effect. He gave with it good food, 1 or 2 grains of quinine a day, and sometimes alcoholic stimulants. He had satisfied himself that it was the hyoscyamine in this treatment which had a restraining effect upon the movements in paralysis agitans. But it was especially in cases of mental trouble that hyoscyamine was of great benefit. In insanity with hallucinatory symptoms, especially in the early stage before the patient could be taken to an asylum, hyoscyamine would do much towards restraining him, and, it would seem, aided in cutting short the disease. He was very careful to give no more of the drug than was absolutely necessary, and he combined it with bromide of potassium, which increased its effect. He had never seen a hypnotic effect from hyoscyamine.

DR. THOMSON'S experience with hyoscyamine, almost from the beginning, had rather prejudiced him against it. One of the first cases in which he had employed it was that of a judge troubled with insomnia. The next day he was unable to hold court, and had bladder symptoms, etc. He had found it useful in asthma with considerable dilatation of the right side of the heart, without bronchitis, but a congested state of the lungs. He had employed it in facial neuralgia, headaches, and various neurasthenic conditions, but had nothing definite to say about its effects. One patient with paralysis agitans was benefited by it among many with whom it was a failure.

DR. KELLOGG had used hyoscyamine in cases of mental excitement. It had not proved the sedative he had supposed it would, but it controlled muscular excitement. He had failed to get any hypnotic effect from it. He had not been favorably impressed with its after-effect in acute mania.

DR. H. S. HINKLEY had found it serviceable in allaying maniacal excitement.

DR. RICHARDS had given from 5 to 7 drops of a one per cent. solution in several cases of insomnia, without effect.

THE INFLUENCE OF FLUIDS UPON THE TEMPERATURE OF FEVER PATIENTS.

GLAX has observed, in long clinical experience, that the consumption of abundant fluids by fever patients is followed by a rise of temperature. A retention of fluids follows their ingestion, and the lessened vascular tone and the slow capillary circulation result in a free oxidation of individual cell-elements. This occasions a rise in temperature, which ends as the fluids find exit through the kidneys.—*Medicinisch-Chirurgische Rundschau*, December 1, 1886.

THE TREATMENT OF VARICOSE VEINS BY INJECTIONS OF CARBOLIC ACID.

SURGEON-MAJOR W. F. STEVENSON states in the *Lancet* (October 23, 1886) that in the last two years and a half he has treated eight cases of varicose vein, some of considerable severity, by the injection of carbolic acid, as recommended by Mr. Cheyne, with the most desirable results, and with no ill effect whatever.

The treatment consists in the injection of one minim of pure carbolic acid at different situations into the enlarged veins, having previously cut off the circulation from the limb by means of an elastic bandage placed above the highest point of puncture. For the latter purpose the tube of an Esmarch's apparatus is best, but a Martin's bandage or two or three yards of elastic webbing will do excellently. Before operating the patient should be directed to stand erect or to sit on the edge of his bed, with his heels on the floor, for about two minutes, in order to allow the veins to become distended. The Esmarch tube should then be passed around the thigh one and a half times, sufficiently tight to stop the superficial venous circulation, and a little time (about a minute) given for the vessels to become well filled below it, the remainder of the tube being then applied so as to cut off all circulation from the limb. Injections of pure carbolic acid, 1 minim each, are then made into the veins at about one inch and a half apart, as many as may be required for each case. A little pledget of absorbent carbolized cotton-wool is placed over each puncture as the needle is withdrawn, and well soaked with collodion. This is allowed to remain until in the course of time it falls off, when healing will usually be found completed. The elastic bandage cutting off the blood-supply should not be removed in less than fifteen minutes after the last injection has been made, and great care should then be taken not to remove it suddenly. The circulation should only be permitted to return by very slow degrees. For at least a week after the operation the patient should not assume the erect position, or put his foot to the ground for any purpose whatever. The pain is very slight; besides that of the pricks of the needle, a burning sensation is felt at the seat of each puncture, lasting for ten minutes or less, and even this is not severe. Certainly no anæsthetic is required. Care should be taken that the subcutaneous injection syringe and needle are "surgically clean," and to insure this they should have been placed in a 1 in 20 carbolic lotion for about twelve hours previously to use. The author has done as many as eighteen injections in one case, and it seems advisable to begin with the injection next to the elastic bandage; that is, the one highest on the limb. Getting the point of the needle well into the vein is not quite so easy a matter as might at first appear; attempts to do so at right angles to it frequently fail, and the injection is thus made into the surrounding tissue. The best plan is to fix the skin over the vessel by means of the left thumb, close below the point selected for puncture, and to direct the needle through the skin and coats of the vein in the long axis of the latter. Mr. Stevenson thinks that in his cases somewhere about ten per cent. of the punctures caused suppuration, a little abscess about the size of a pea forming where this occurred; but this process, as the result of the caustic action of carbolic acid, was curiously slow and almost absolutely painless. Three of his cases were done to remove the cause of varicose ulcers of the leg, which had been healed over and over again by rest in bed and different means of local treatment, but which had broken out afresh on the patient's commencing to get about again.

PATHOLOGY AND THERAPY OF FEVERS.

PROF. FINKLER considers that by our studies of the nervous system, by the large number of agents which depress temperature, and from our knowledge of infection we are able to form a reasonable hypothesis regarding the phenomena known as fever. It is proven that the heat-producing and regulating mechanism of the body is at fault; and he considers that the three stages of the fever's development are especially instructive, as throwing light on its subsequent course.

The writer believes that Pflüger's labora-

tory researches have shown that fever is a neurosis, a paralysis of the centre which governs temperature. The phenomena of fever are dependent upon temperature; these phenomena form a useful reaction against the effects of a toxic agent. He observes that antifebrile treatment by baths must be given with reference to the laws governing the nervous mechanism of heat, and when so given is of the greatest value.

Drugs which directly influence fever exist, but have few grounds of decided worth.

Combined treatment by baths and specifics he considers the most efficient.—*Medicinisch-Chirurgische Rundschau*, December 1, 1886.

A NEW OPERATION FOR HYPOSPADIAS.

MR. T. N. FITZGERALD states in the *Australian Medical Journal* for September 15, 1886, that after having tried most of the feasible and recognized operations for the relief of hypospadias, the results in most cases being disappointing, he conceived the idea that if a subcutaneous opening could be made to simulate in size and shape as nearly as possible the natural urethra, the instrument not to crush but divide the structures, and this opening kept patulous with some smooth, unabsorbent material, success might be possible. Accordingly, he has carried out this plan in two instances, and in both with perfect success, and he reports tolerable full notes of one of these cases.

This was a child aged 8 years, in whom at first the sex was not easily discernible. Both testicles were high up in the canals at the interior rings and the scrotum flattened out. The diminutive penis was drawn down upon the perineum, and the rudimentary corpora cavernosa difficult to be distinguished. The urethral opening was close to the scrotum, making this a case of peno-scrotal hypospadias. Having carefully examined the case, Mr. Fitzgerald decided to free the penis by a careful dissection, and then attempted to form the urethra, raising the glans and making a free transverse incision, as recommended by Duplay. The strong fibrous bands which existed under the corpora cavernosa and cura forming them were freely divided. After a little troublesome dissection the body of the diminutive organ was raised up and the lozenge incision brought together laterally by horse-hair sutures. A wire stage was erected on the pubis, the little penis transfixed by a hare-lip pin, and fixed in position with fine silver wire. The case did remarkably well, and in about six weeks was discharged with instructions to return in six months to undergo the second operation, namely, the forming of a new urethra.

On his second return, after nearly a year, chloroform having again been administered, he was placed in the lithotomy position and the second part of the operation completed. The distance from the end of the penis to the urethral orifice was about two inches. The organ was put on the stretch in the vertical position, and a long, sharp tenotome introduced in a slight indentation where the urethral orifice in the normal state ought to have been, and gently pushed downwards and backwards to a site a little behind and to the side of the hypospadias opening. The channel thus made a vertical slit simulating the normal urethra as much as possible.

A previously-prepared glass rod, about the size of a number six English bougie, well oiled, was then passed down the newly-made canal, and allowed to project just below and to the side of the lower opening. The penis was held upwards, and the glass rod fixed in position by the aid of a wire stage erected on the pelvis. The case after operation did very well. The urine ultimately being passed out of the artificial urethra, which became lined with mucous membrane, and the slight fistula which remained at the site of the hypospadias opening being readily cured by paring the edges and inserting a suture. Mr. Fitzgerald states that the boy is now perfectly well, and able to void all his water in a good stream by the new passage.

THALLIN IN DISEASES OF CHILDREN.

STEFFEN writes in praise of thallin in fevers in children because of its ready solubility in water, its freedom from disagreeable taste, its prompt effect, and lack of ill after-effect. A depression of temperature occurs an hour after taking, and persists three or four hours. The doses range from ⅔ of a grain to 2 grains, and rarely need be repeated more often than twice in twenty-four hours.

The fall of temperature ranges from a degree and a half to four; this is dependent not only upon the patient's peculiarities, but varies with different hyperpyrexias. In typhoid fever and in lung-diseases the greatest effect is observed; in scarlatina, measles, and diphtheria the result is least apparent. In rare cases only, when the temperature rises rapidly a second time, a decided chill and cyanosis, but without collapse, have followed

the reduction of temperature by thallin.—*Medicinisch-Chirurgische Rundschau*, December 1, 1886.

MEDICATION OF NERVES.

Dr. J. Leonard Corning recommends for the treatment of nervous affections, in the *New York Medical Monthly* for November, 1886, the method which he described some time ago, of prolonging the anæsthesia produced by hypodermic injections of cocaine through the suspension of the circulation in the part. He reports three cases of sciatica in which he injected 100 minims of a one-half per cent. solution of cocaine at the more painful points along the course of the nerve, and immediately thereafter applied a tourniquet in such wise as to interrupt the circulation in the crural above the point of injection. During the first five or ten minutes after this injection little relief was experienced, and after a lapse of twenty minutes the pain had sensibly diminished and in half an hour had entirely disappeared. After the removal of the tourniquet pain did not return until the following day, and the mode of treatment was repeated for three weeks, the periods of freedom from pain becoming longer and longer until the pain finally totally disappeared; and now, four months after the last injection, there has been no return of the pain.

PHENYLHYDRACIN A SUGAR-TEST IN URINALYSIS.

Dr. von Jaksch, assistant to Prof. Nothnagel in Vienna, employs this substance as follows: Twice as much of the powdered chemical as will lie on a knife-point and four times the quantity of sodium acetate are added to half a test-tube of water which is slightly warmed; an equal volume of the suspected fluid is added, and the mixture heated for twenty minutes in a water-bath, after which it is placed in cold water. If a large amount of grape-sugar be present a yellow crystalline precipitate will form, which on microscopic examination is seen to be composed of needles of yellowish color, alone or in bundles. With large amounts of sugar this precipitate becomes macroscopic.

If no precipitate but a cloudiness results, the liquid is put in a conical glass and again examined, when a few crystals denote a trace of sugar, amorphous yellow matter meaning nothing.

This test is especially useful in cases of poisoning from coal-gas, etc.; also after deep chloroform narcosis and the taking of a large amount of salicylic acid, and in transudates and exudates in the abdomen or thorax.

The author's experience would recommend phenylhydracin most highly as a clinical reagent.—*Deutsche Medizinal Zeitung*, November 8, 1886.

SACCHARIN.

The alleged antifermentative property of saccharin has been the subject of a comprehensive series of experiments by Messrs. Aducco and Mosso (*Chem. Zeit.*, October 10, p. 218). It was found that in the proportion of 0.16 per cent. saccharin distinctively and persistently diminished the activity of beer yeast at a temperature both of 16° and 30° C. In a mixture of equal parts of 0.32 per cent. saccharin solution and urine, kept at a temperature of 16° to 17° C., ammoniacal fermentation had not commenced at the end of seven days, while a mixture containing the same proportion of salicylic acid had broken down. A saccharin solution retarded the lactic acid fermentation in milk, and the action of a preparation of pancreas was also considerably slackened by it. Added to a pepsin solution in the proportion of 0.16 to 0.32 per cent. saccharin retarded the peptonizing of coagulated albumen, though without stopping it, but upon reduction of the saccharin to 0.0064 per cent. the gastric juice was then scarcely affected. Comparative experiments showed benzoic acid to be equally powerful in this respect, and salicylic acid a little more so. In the proportion of 0.16 to 0.32 per cent. in acid and neutral solutions saccharin proved capable of affecting the amylotic action of saliva, the effect being least in the neutral solutions. Salicylic acid proved rather more powerful in similar solutions, and boric acid had about the same effect as saccharin. Professor Salkowsky also reports results that are perfectly in accord with the foregoing (*Chem. Zeit.*, October 10, p. 218). He states that the antiseptic property of saccharin is due to an acid action, and is greatly diminished upon neutralizing with sodium carbonate.—*Pharmaceutical Journal and Transactions*, October 30, 1886.

THE TREATMENT OF CHRONIC DIARRHŒA BY SULPHOCARBONATED WATER.

Dr. de Champeaux reports in *Bull. Gén. de Thérapeutique*, November 15, 1886, two cases

in patients greatly enfeebled by exposure at sea and in the tropics where fœculent, chronic diarrhœa was cured by this agent.

It was given in doses of from 20 to 60 grammes (f℥v to xv) in milk during the twenty-four hours, and as an adjuvant to tonic and astringent drugs.

Its use must be patiently continued, and the results are obtained only after prolonged use.

Its mode of action is explained by Dujardin-Beaumetz as being disinfectant, destroying micro-organisms and neutralizing ptomaines, and thus removing the irritating causes which keep up the intestinal lesion. It may be prepared in the following formula:

Bisulphide of carbon, ℥vi¼;
Water, Oi;
Essence of mint, 30 drops.

Place in a flask containing three pints. Shake thoroughly.

THE TREATMENT OF INTUSSUSCEPTION BY INFLATION AND MASSAGE.

Dr. B. W. Cheavle reports in the *London Lancet* for October 23, 1886, three successive cases of intussusception, occurring in children, successfully treated in this way. The method which he employed in these three cases was to inject air into the rectum by means of Higginson's syringe, at the same time kneading the abdomen externally. It was found that at least three assistants were required to carry on this operation satisfactorily: one to work the syringe, one to press the anus to prevent the escape of air, and the third to manipulate the abdomen. His experience in these three cases has been that the tumor will disappear after some minutes, and should it return, may be again removed by a repetition of this procedure, and the escape of the air subsequently has in all his cases been followed by a natural passage from the bowels. Where great pain existed, or where much struggling was caused by the mode of treatment, Dr. Cheavle employed chloroform, and in one case administered one drop of laudanum.

PHYSIOLOGICAL TREATMENT OF CHOLERA.

Prof. Semnola believes that we have as yet no means of destroying the cholera bacillus in the organism, and also that the heroic treatment of the premonitory, or algid stage, is extremely dangerous. He, therefore, advises a mode of treatment which he describes as physiological.

This treatment consists in absolute rest of the whole organism, and especially the digestive organs, from the time of the first manifestation of diarrhœa.

In six thousand cases at Naples in a late epidemic, it was observed that the giving of a few teaspoonfuls of bouillon after the first attack was sufficient to cause a severe relapse. Nourishment when taken should be in the form of milk.

The preservation of bodily strength the author thinks most important, and seeks to accomplish this by warm baths. Given in the first stage of cholera they relieve visceral congestion, promote elimination through the skin, and exercise a tonic influence on the nervous system. After the bath the patient is wrapped in woollens, and given warm, aromatic, and alcoholic drinks.

Opium in small doses is the only drug the author considers useful.—*Medicinisch-Chirurgische Rundschau*, No. 20, 1886.

BORACIC ACID AS A LOCAL ANTISEPTIC.

Dr. A. C. Ewing states in the *American Practitioner and News* for November 13, 1886, that he has recently used boracic acid in the treatment of a deep suppurating wound in the palm of the left hand, which had been inflicted two weeks previously, and was now suppurating tolerably profusely. The patient's hand was in a semiflexed position from the involuntary contractions of the tendons and fascia, and was the seat of extremely acute pain. He employed about 30 grains of powdered boracic acid, dissolved in a half-ounce of water, and applied on a pad of absorbent lint. The patient reported that this application entirely freed him from pain, and the wound could be freely manipulated without causing the patient any suffering. Dr. Ewing states that he is still using the same dressing, applied once daily, on account of its excellent antiseptic qualities, and that the wound is healing rapidly by granulations, and that the necessary manipulations required to overcome the stiffness of the tendons and fascia could be employed without causing the patient pain.

THE ACTION OF SOLANINE.

This substance, discovered in 1821 in France, is obtained from potato-shoots and also from the parings of very young or very old potatoes. It becomes glucose when treated by some of the acids, and this change

is thought to occur in the organism under the influence of gastric juice.

With acids it forms salts.

Although known for many years, it has been neglected by therapeutists.

Dr. Genenil has given it in doses from ¾ of a grain to 5 grains three or four times daily. He commonly orders 3 grains in grain-doses. He does not hesitate to give 6 or 8 grains daily, if needed. It may be given in capsules or hypodermically, also upon a denuded surface or by inunction with fats. The author considers solanine a narcotic to the medulla, spinal cord, and nerve-trunks, and paralyzant to the terminal ends of motor and sensory nerves.

It may be given without danger in large doses; it does not have cumulative effects; it has none of the inconvenient after-effects of morphine or atropine.

It does not produce cerebral congestion, and so may be given to the aged and to children; its use is indicated wherever we have to combat excitement, spasm, and pain. The author's best results were obtained in the treatment of sciatica.—*Bulletin Général de Thérapeutique*, vol. iii.

IODINE IRRITATION.

The external application of the tincture of iodine made with a badly-rectified spirit, containing acetone, may be followed by great irritation of the epidermis, or even vesication, and similar results may occur when a preparation of good quality is used on a susceptible patient. M. Carles points out that the irritation may be removed immediately by the application of alkalies and alkaline salts, dilute ammonia or soda crystals being permissible where the epidermis is robust, as on the hands, whilst alkaline sulphites, bisulphites, or hyposulphites are preferable for more delicate skin. But the best agent, in M. Carles's opinion, is sodium sulphydrate, an aqueous solution containing from one to ten per cent., according to circumstances, giving relief in a few minutes. It may also be used for removing iodine stains.—*Pharmaceutical Journal and Transactions*, October 30, 1886.

THE ALKALOID OF THE TULIP.

Gerard has isolated from the garden tulip the body tulipine, which is furnished by all portions of the plant. Its chemical and physiological properties are allied to colchicine, scillitine, and veratrine; it forms with acids crystalline salts. Its formula is not yet known.

1½ grains is a fatal dose for a cat, death occurring from cardiac paralysis.

In medicinal doses of $\frac{1}{12}$ and $\frac{1}{10}$ of a grain it increases the secretion of saliva, and is diuretic and laxative.

Its effects upon the brain and spinal cord resemble those of colchicine and veratrine, the latter of which is a poison to the nervous system, while the former affects principally the heart and digestive tract.

Dr. Nicot has found the action of tulipine to resemble not only that of veratrine and colchicine, but also that of strychnine.—*Les Nouveaux Remèdes*, November 24, 1886.

TREATMENT OF TYPHOID CONDITIONS BY BENZOIC AND SALICYLIC ACIDS.

According to the Paris correspondent of the *British Medical Journal* (October 23, 1886), at a recent meeting of the Société Médicale des Hôpitaux, M. Albert Robin proposed a new method of treating typhoid conditions in which the organism is always overcharged with the incompletely oxidized residues of nutrition. These residues were eliminated with difficulty, owing to the fact that they are but slightly soluble in the fluids of the human body. There were certain pharmaceutical substances which combine with the nitrogeneous residues of the human organism, and rendered them more soluble, and this facilitated their elimination. The principal agents which acted in this way were benzoic and salicylic acids, which, after combining with nitrogeneous substances such as glycocol, passed into the urine as salicyluric and hippuric acids. M. Robin, in his first experiment, studied the physiological action of benzoic acid on combustible substances. He administered benzoic acid to persons in good health, whom he had previously dieted for a few days. Under the influence of this treatment the solid constituents of urine slightly decreased, and there was also a smaller proportion of urea, consequently its relative proportion to solid matter was lower. These results could not be attributed to a moderating action of benzoic acid on combustion, but to the action of the acid in carrying away into the urine part of the combustible substances. On another occasion M. Robin administered benzoic acid to five patients with typhoid fever, in whose urine he noticed an increase in the weight of urea and solid matter. Salicylic acid and

salts gave the same results, as also did substances such as toluene, zylene, toluic acid, ethyl, and propylbenzine, which, in passing through the system, become transformed into benzoic acid.

TREATMENT OF ANAL FISSURE.

DR. CREQUY proposes to treat this affection by introducing within the fissure a fragment of lint soaked in a solution of chloral, 1 to 50. This application is made after the morning stool, and is expelled on the following day, when the bowels move. Its action as a stimulant to granulations and a local antiseptic has been most happy.—*Les Nouveaux Remèdes*, November 24, 1886.

SUBMUCOUS INJECTION OF LACTIC ACID FOR THE CURE OF THE EARLY STAGE OF LARYNGEAL PHTHISIS.

At a recent meeting of the Medico-Chirurgical Society of Montreal (*Medical News*, November 13, 1886), DR. GEORGE W. MAJOR, in a short paper, related his experience of lactic acid as a local application in the ulcerative stage of laryngeal phthisis. He said that it was probably the most speedy and most efficacious plan of treatment yet introduced. Ulcerations healed under it most kindly, and tuberculous deposits underwent absorption more rapidly than by any other means. But it was of lactic acid employed as a submucous injection into the substance of the laryngeal tissues that he wished to speak. In the early swellings and œdemata it had rendered very remarkable results in Dr. Krause's (Berlin) hands. Dr. Major had the privilege, during the past summer, of seeing many of Dr. Krause's cases, and he was happy to be able to endorse all that had been maintained by Dr. Theodore Herring, of Warsaw, and Dr. Krause in its favor when used as an injection. Dr. Major employed a twenty to thirty per cent. solution of the remedy, and inserted at one sitting from fifteen to twenty minims of the liquid. Very trifling pain followed, and but little after-irritation was induced. The swellings disappeared in periods varying from twenty to thirty days, and ulcerative changes were avoided. A case undergoing treatment by injection was exhibited to the members of the society, and the result was deemed very satisfactory and encouraging. Dr. Herring's syringe, as modified by Krause, was the instrument employed for the injections. Altogether, Dr. Major regarded the lactic acid treatment of laryngeal tuberculosis as the greatest advance yet made in the treatment of this disease, and looked forward to a great future for it.

TURPENTINE IN CHRONIC DISEASES OF THE RESPIRATORY ORGANS IN CHILDREN.

DR. DESCRAIZILLES describes several cases where the diagnosis lay between chronic bronchitis and tuberculous infiltration, with the physical signs of cavities, in which turpentine produced very beneficial results.

In the *Revue Mensuelle des Maladies de l'Enfance* the author describes the preparation which he uses as a solution in alcohol or water of turpentine which is "*hydrated*,"—has been long exposed to the air. He commonly used the following formula:

> Turpentine, grs. xxx;
> Alcohol, f℥x;
> Water, f℥v.

A quantity not exceeding 9 grains of the solid daily gave excellent effects. In omitting alcohol from the solution at least 6½ ounces of water will be required to 15 grains of the solid, and it is then advisable to add an astringent syrup. Such solutions are best given at meals.

The effects were the rapid lessening of foul expectoration and a tonic influence upon digestion.

ŒDEMA OF THE PREPUCE.

DR. J. G. TAPPER writes to the *New York Medical Journal* for November 6, 1886, that for several years past he has been treating very successfully the great œdema and infiltration attending many cases of phimosis and paraphimosis as the result of congenital or specific causes. In many cases occurring in the adult we find a perfect horror of being confined to the bed. In fact, unpleasant circumstances connected with the trouble render it imperative that our patient should engage in his usual occupation during the treatment. These requirements have led him to the adoption of the following measures: He saturates a given quantity of absorbent cotton with chemically pure glycerin in which bichloride of mercury has been dissolved in proportions varying from 1 in 1000 to 1 in 5000, according to the amount of fœtor present; or, in place of the bichloride, iodoform, carbolic acid, or any antiseptic agent preferred

may be used. With the cotton so charged he completely encircles the organ so far as it is involved. Over this a large rubber condom is drawn, which is then suspended from an abdominal band. This dressing is to be repeated every six hours until the œdematous condition disappears. At that time a beginning pallor will be observed, and often in from twelve to twenty hours the prepuce will have become very pale and shrivelled. The great majority of cases yield promptly, and no further progress is observed after the first application. If ulcers are present, it will often be discovered that they have taken on a healthy action before it has been possible to expose them, and not infrequently this progresses until the cure is completed. The advantages of this dressing are: It is cleanly; there is no difficulty in applying it, patients frequently continuing the treatment at their rooms or places of business after the first dressing; it does not expose or confine the patient; and the results in his hands and in those of others who have tried it at his suggestion, have been very satisfactory.

THE INFLUENCE OF COCAINE UPON THE SKIN.

HERZOG has reported (in the *Münchener Med. Wochenschrift*, No. 13) that pencilling the intact skin with ten and twenty per cent. solution of cocaine has no effect whatever. He therefore employs the galvanic current, as recommended by Wagner, and uses as anode an electrode constructed by Stintzing, in which the fluid—the cocaine solution—serves directly to conduct the current. This anode is generally placed upon the forearm, and an ordinary electrode taken in the hand of the opposite side. Galvanic current and cocaine together produce anæsthesia. To increase this the strength of both agents must be increased together. A gain in intensity is, however, no gain in duration. This method has no result upon deeper tissues.

Upon a thinned or denuded skin the ordinary injections and applications are useful, especially to painful excrescences. Urticaria was cured by a ten per cent. solution.

Cocaine is a vigorous agent in rendering the skin anæmic.

TREATMENT OF SUBSTANTIVE EMPHYSEMA.

DR. FRANCIS DELAFIELD read a paper on the "Treatment of Substantive Emphysema" before the New York Academy of Medicine. For the chronic interstitial pneumonia which so often attends the disease he suggested change to an out-door life in a favorable climate, total abstinence from alcohol and tobacco, and partial abstinence from sugars and starches. Iodide of potassium, iron, and cod-liver oil might, by improving the general health, delay or modify the progress of the disease, without any specific action upon it. He also recommended the inhalation of compressed air, and the expiration into rarefied air, to make the pulmonary circulation more active, and thus bring about a change for the better in the nutrition of the lung-tissue. He had more frequently used compressed oxygen gas with real benefit.

The *constant dyspnœa* he thought arose from thickening of the walls of the air-cells and bronchi, with dilatation and congestion of the blood-vessels in the stroma of their mucous membranes; also from chronic endarteritis, rigidity and contraction of the walls of the arteries; also from dilatation and hypertrophy of the right ventricle; all interfering with the circulation. The sudden attacks of dyspnœa were due to contraction of the pulmonary vessels, which disappeared after death, as they could then be injected readily.

The remedies were those already enumerated, and drugs known to diminish arterial tension, such as iodide of potassium, chloral hydrate, belladonna, stramonium, and opium.

Some of the severest asthmatic attacks came from spasmodic contraction of the bronchi. The remedies were the inhalation of the fumes of stramonium and nitrate of potassium, chloroform and ether; the use of emetics, belladonna, the compound spirits of ether and opium.

For the venous congestion of the stroma of the mucous membrane, which is often so great as to make it resemble erectile tissue, the remedies are those which cause a large and rapid exudation of mucus from the bronchi, such as lobelia and grindelia robusta; the rapid determination of blood to the skin by means of dry cups, and such drugs as stimulate the heart, like caffeine, convallaria, and digitalis.

For the spasmodic contraction of the smaller branches of the pulmonary artery, which causes so much distress in this disease, as it also does in angina pectoris and in uræmic attacks, we must use the remedies which quickly diminish arterial tension, such as amyl nitrate, chloral hydrate, potassium iodide, and opium.

Chronic bronchitis is a very important feature in many cases of emphysema. It is

more apt to be favorably affected by change of climate and mode of life than by drugs.

For the general venous congestion, loss of nutrition, and anæmia the indications seemed to be to use cardiac stimulants, such as caffeine, convallaria, and digitalis; to improve the nutrition by iron, oxygen, and fats, and change of climate.

DISCUSSION.

Dr. Wm. H. Thomson thought there was bronchitis in all cases, and this was generally caused by chills of the skin from too thin clothing: flannel, or even buckskin, should be worn from November to June of each year; thick shoes, woollen stockings, sleeping in flannel in the winter-time, etc.

The next great cause was the excessive use of meat in this country, viz., meat three times a day, or with all the meals. The nitrogeneous wastes irritated the blood-vessels, especially of the lungs, kidneys, and other organs, producing general sclerotic disease, with thickening of all the arteries and excessive growth of new interstitial connective tissue. He believed, next to change of climate, an emulsion of linseed-oil was the best remedy for the bronchitis, although it was true that chloral and morphine were generally added to it. Linseed-oil was the best of all expectorants. For the sclerosis and excessive growth of connective tissue he thought small doses of corrosive sublimate more useful than iodide of potassium, when aided by light diet, such as milk, koumiss, fish, vegetables, fruits, etc.

Nitro-glycerin was a good palliative, and sometimes more: it not only lessened arterial tension, but raised the specific gravity of the urine, and cleared the blood of many waste and irritating products. Arsenic was another useful remedy; it, phosphorus, corrosive sublimate, and cod-liver oil all produced fatty degeneration, softening of sclerotic tissue, and thus aided their absorption or removal.

Dr. George L. Peabody agreed with Dr. Delafield in almost all his views, and thought his symptomatic treatment admirable. He disagreed with those who supposed that iodide of potassium or any other remedy could act as a resolvent of hardened and thickened connective tissue, except in syphilitic cases.

Dr. Kinnicutt thought that spasm of the small vessels played as large a rôle clinically as claimed for it by Dr. Delafield. He believed that nitro-glycerin was even more useful in chronic and persistent dyspnœa than in acute spasmodic attacks. He gave it internally in small doses three times a day, and was satisfied with the relief caused by it. Chloral and the iodides were also useful.

Dr. Putnam Jacobi laid stress upon the value of compressed air, and cited cases relieved by it. It neutralizes the dead residual air which remains in such large quantities in the air-cells and smaller bronchi in cases of confined sclerosis and emphysema of the lungs; also the retained carbonic acid gas, which is such an important irritative cause of the growth of new connective tissue.

Dr. J. Peters, the Chairman, called attention to the iodide of ethyl, which has a larger quantity of iodine in it than any other preparation. If the iodine in the iodide of potassium is the active agent, then iodide of ethyl must be still more useful. It is volatile, and may be used for inhalation, like nitrite of amyl and nitro-glycerin, and may also be taken internally. Whatever the theoretical views may be about it, it certainly is a very useful remedy in emphysema. It has an anæsthetic action when inhaled. It is absorbed into the blood, decomposed in the body, and excreted as iodide of potassium. It has been given internally in doses of 2 to 5 decigrammes, or 3 to 8 grains, in scrofula, obstinate catarrhal and rheumatic affections, and in cardiac dropsy. Its chief use, however, according to Brunton and others, is as an antispasmodic in asthmatic paroxysms, either of the purely spasmodic kind, or occurring in chronic bronchitis and emphysema, or in cardiac or laryngeal disease. In some cases it gives very great relief, and not only cuts short the paroxysm, but benefits the bronchitic condition.

Muriate of ammonia has a great reputation in Germany in the resolution of thickened and sclerosed tissues. Dr. Peters sincerely hoped that this might be so, and was inclined to sympathize with those who claimed the same for phosphorus, arsenic, and corrosive sublimate. He was an optimist in medicine: there were so many powerful drugs which produced such manifest changes in the functions and tissue metamorphoses of the body, that it seemed as if we at some time, and hopefully not in the far-distant future, would learn how to apply them successfully even in the cure of some organic diseases.

He also called attention to nux vomica as a great heart tonic, often useful when digitalis, caffeine, and convallaria had failed. It was also useful in emphysema in compensating the weakness of the respiratory muscles which often prevailed, and which so often caused chronic dyspnœa. It would have to be avoided in spasmodic attacks, in which, and

spasm of the blood-vessels, he suggested conium as the most powerful paralyzer of muscular action that we were acquainted with.

Reviews.

MANUAL OF OPERATIVE SURGERY. By Joseph D. Bryant, M.D.
New York: D. Appleton & Co., 1887.

The work of Prof. Bryant, while it does not pretend to be a rival of the larger works or systems of surgery, is of its kind a most excellent book. Theories and doubtful methods of operating find no place in the volume. It is rather to known facts and established procedures that the author has limited his labor, and the judgment which he evinces in selecting from the various methods of operating in surgical cases is generally of a most reliable nature; indeed, it is this selecting from many proposed procedures, which are usually met with in the larger surgical works, that much of the value of Prof. Bryant's book depends, and in this respect the book becomes a very able aid to the unexperienced surgeon. The scope of the work includes most of the surgical diseases, and the operative methods for their relief or cure. The operations peculiar to the female sex, and the surgery of the eye and ear, are not considered in the book.

Chapter i., which discusses "General Consideration," or what may be termed the technique of surgical operations, is a most valuable one. The various rules and suggestions which are found here are evidently the outcome of a large experience and an observing surgeon. A careful study of this section of the book will undoubtedly tend to perfect operative surgery, and a faithful carrying out of the various methods proposed must certainly give more satisfactory results than would otherwise be obtained; since it is very often just this attention to seemingly small matters that determines the favorable termination of an operation, and a neglect or careless performance of minute details may frequently defeat the successful result of the surgeon's labor.

The chapter on "Agents for Controlling Hemorrhage" is all that could be desired, being very complete, and fully represents all the advances of modern surgery. It is with much satisfaction that we find the author an advocate of the catgut ligature for ligating arteries of every size, and with him we have never had occasion to regret their employment, believing they offer the same amount of security against accidents as any other variety of ligature.

Chapter iii., on the "Treatment of Operative Wounds," is a most important one, and treats of that department of surgery which, of all others, is at the present time claiming more attention from surgeons than any other. The question to be settled, if it is not already decided, is that of antiseptic surgery. Much has been written pro and con of this subject, and it is yet not finally, or at least universally, agreed upon who are in the right. Prof. Bryant, it gives us much gratification to say, is another to be added to the list of those who advocate the adoption of antiseptic measures in the dressing of wounds after operation, and the rules he gives in order to accomplish this end are those which may be adopted with every probability of success.

Chapter iv. treats of the "Ligature of Arteries," and the directions given for performing this operation upon the different arteries are brief, but in no way deficient in the necessary information to successfully ligate any vessel, provided strict attention is given to the author's rules. The illustrations which are given under this chapter are unusually good, and will greatly aid one in the study and practice of this operation.

"Operations on Veins, Capillaries, etc." This chapter considers ligature of veins, and the very proper advice is given to ligate these vessels, when of any size, if divided during the course of an operation. The advisability of securing the borders of a partly divided large vein with catgut is thought to be a questionable procedure, notwithstanding it has been recommended by many writers, and the danger of secondary hemorrhage believed to be much greater than if the vessel is tied above and below the wound in its walls. The operation of excision, crushing, and ligaturing for hemorrhoids is described, the preference being given to the ligature. Having had occasion to perform this operation quite frequently, and having taken the opportunity to employ the several methods proposed by different writers, we have, from our experience, decided upon the crushing operation with the cautery, since the results both to ourselves and patient have, we think, been much more satisfactory than when other methods have been employed. The operation by injections of carbolic acid or astringents has in our hands not proven itself very satisfactory. The author also cannot recommend it, and the occasional bad results—abscesses, gangrene—

which may follow its use should make us hesitate to employ it. The operations for varicocele, venesection, transfusion, and nævus are also given in this chapter.

Chapter vi., on "Operations on the Nervous System," in which the operation of trephining is given, and Prof. Bryant thinks it is one which is more often performed than the requirements of many cases warrant. From our experience in this class of cases we have formed rather the contrary opinion,—that is, there has been a neglect on the part of the surgeon, and the operation has been postponed until too late, or not performed at all. To consider the opening of the skull cavity as a trifling surgical operation, one that may be compared with the amputation of a phalanx in severity, as has been done, we believe to be rash and dangerous surgery, but by employing every care, and the use of every antiseptic precaution, the operation is generally not followed by any unfavorable results. Cerebral localization as a means of diagnosis in head injuries has also received the attention of the author, and its importance in assisting the operating surgeon indicated. Division, excision, and stretching of the nerves are included under this chapter; and it is advised, when possible, if excision be done, not less than two inches in the continuity of the nerve should be removed. The suturing of divided nerves is recommended, its results being in every way favorable, while the practicability of nerve transplantation is as yet thought to be undetermined.

The chapters devoted to "Operations on Tendons, Fasciæ, Muscles, and Bones" are well written, and include all that modern operative surgery has advanced to benefit these lesions. More especially is this to be noticed under the various operations which have been proposed and done for the different bone lesions. Amputations are described in full and profusely illustrated, making a very valuable chapter on this important division of operative surgery. Under deformities we should have liked described the method of applying the plaster-of-Paris jacket by means of the hammock for curvature of the spine, in addition to the method of suspension of the patient; since the former is quite as efficient and much more comfortable to both patient and surgeon in its application, more particularly may this be said in regard to young children. Plastic surgery is very thoroughly described, and numerous cuts are given to illustrate this division of operative surgery, which greatly facilitate one to understand the various methods proposed for the relief of the lesions in which such operations are necessary. A chapter is devoted to "Operations on Hollow Viscera in Contact with Serous Surfaces," and includes, among others, those operations which may be performed upon the intestinal tract, and those in connection with the kidney, spleen, and hernia. The operations on the anus and rectum have received due attention.

The chapter on "Operations on the Urinary Bladder" describes catheterization, aspiration, cystotomy, and digital exploration of this organ. Lithotority, lithotapaxy, and lithotomy are also fully described. An instrument, devised by the author, combining both a crusher and evacuating-tube, to be employed in removing the last fragments after the larger instrument has been used, or to remove a very small calculus, seems to us a most useful and valuable accessory to the mechanical appliances that may be utilized in performing the crushing operation.

Chapter xvii., on "Operations on the Penis and Scrotum," discusses those for hydrocele, and preference is given to incision with excision, while injection of the sac is also spoken highly of. In the employment of the tincture of iodine for the latter purpose the author directs it to be diluted with three or four parts of water. This we believe to be a mistake, and in our practice we invariably use the undiluted tincture; the result has always been satisfactory; indeed, so much so that for the past few years we have entirely confined ourselves to its use in the treatment of this lesion. The operations for "congenital malformation of the urethra" and for "acquired urethral defects" are in no respect deficient, and represent very completely our knowledge on these subjects. External and internal urethrotomy are briefly described, and, in regard to the latter, Otis's operation has received a full description, from which we would infer that the author regards it favorably, and to speak of our own experience of this method of treatment of urethral stricture, we have had a successful result in every case in which it has been employed, and we are inclined to consider the operation the best yet advanced for this lesion.

The concluding chapter of the book is headed "Miscellaneous Operations," and includes, among others, extirpation of the breast, tracheotomy, operations for ganglion, wiring of bones for compound fractures and fracture of patella, etc.

In concluding our notice of Prof. Bryant's book, it remains for us to congratulate him

upon the successful result of his labor. He has written a very able and reliable surgical work, one that may be consulted both by surgeon and student, and one that contains all the more important advances of modern surgery. The publishers' part of the work has been well done, and the numerous illustrations add much to the value of the volume.

J. H. C. S.

THE SURGERY OF THE PANCREAS, AS BASED UPON EXPERIMENTS AND CLINICAL RESEARCHES. By N. Senn, M.D.

The above pamphlet is a reprint of Dr. Senn's essay read before the American Surgical Association, April, 1886, and in which, as stated by the writer, "an attempt will be made to lay the foundations for a rational method of treatment of some of the injuries and diseases of the pancreas by direct surgical measures." This study begins with the anatomy of the organ; in fact, its development and also its physiological function. Experimental investigations were made in order to ascertain the tolerance of the pancreas to direct treatment, and also with the object "to elucidate some of the causes and pathological conditions of some of the well-recognized lesions of this organ." Traumatisms are considered under contusions and wounds, both penetrating and gunshot. Acute and chronic inflammation of the pancreas, also gangrene and abscess, are quite fully described. Hemorrhage of the pancreas, including hemorrhagic cysts and diffuse hemorrhage, have received attention. Cysts of the pancreas, and tumors of the pancreas, including hypertrophy, sarcoma, and carcinoma, are treated of by the author, and finally a consideration of tuberculosis, lipomatosis, and lithiasis of the ducts of the pancreas terminate the work.

THE MECHANISM OF INDIRECT FRACTURES OF THE SKULL. By Charles W. Dulles, M.D. Philadelphia: P. Blakiston & Co., 1886.

This brochure by Dr. Dulles discusses, and very ably endeavors to determine, the mechanical law which influences indirect fractures of the skull. That portion of his essay which relates to the historical part of his subject is an evidence of much research, and we feel indebted to him for arranging it together in such a readable form. In order to satisfactorily present his subject, Dr. Dulles has studied it under the following heads: "Elastic Properties of the Skull," "Anatomical Peculiarities of the Skull," "Architectonic Peculiarities of the Skull," "Influence of Soft Parts and Contents of the Skull," and finally "Study of Cases." The conclusion arrived at by the author is that the "bursting theory" has more to recommend its acceptance than any other; indeed, he believes it to be sustained by "reasoning, experiment, and clinical observation."

OUTLINES OF THE PATHOLOGY AND TREATMENT OF SYPHILIS AND ALLIED VENEREAL DISEASES. By Hermann von Zeissl, M.D. Revised by Maximilian von Zeissl, M.D. Translated by H. Raphael, M.D. D. Appleton & Co., New York, 1886.

The influence of the Vienna school over Germany, and the entire medical world, has during the past twenty or thirty years been of a very decided and positive character, and in no special branch of medicine has this influence been greater than in that relating to the subjects treated of in the above volume. The names of Sigmund, Hebra, and Zeissl must ever remain in the foreground as investigators, writers, and teachers upon the various lesions resulting from venereal diseases. The translation of Prof. von Zeissl's work we consider to be a most valuable addition to English medical literature, and congratulate the translator upon the faithful and most excellent rendering he has given us; indeed, we have not noticed, in a careful reading of the book, any serious errors or obscure passages, which are so liable to occur in a translated work.

The book is divided into three sections, which treat respectively of gonorrhœa, soft chancre, and syphilis. The section devoted to syphilis occupies about two-thirds of the volume. An introductory chapter on "The Venereal Contagions" gives a brief *résumé* of the opinions held by the authors upon this very important subject. It is here stated the belief that there exists two kinds of poisons, separate and distinct, one for the chancre and one for the chancroid. Semen is thought to be a probable carrier of the virus. Why all syphilitic parents do not beget syphilitic children is said, as yet, not to have been determined. The discharge from a chancroid upon a syphilitic person inoculated upon a non-syphilitic is stated always to result in a chancroid only. Syphilitic inflammatory lesions, papules, nodules, etc., when irritated by implanting upon these chancroidal secretion, are said to be capable of causing the primary lesion of syphilis when inoculated upon a non-syphilitic individual. Mixed chancre, such as described by the Lyons school, has been discarded long ago. The syphilitic pri-

mary lesion (chancre) is believed to be the first manifestation of general, constitutional syphilis. We have selected the above principles from those given by the authors in order to show the views which they hold upon the points that are still disputed by writers upon these subjects. When it is remembered that the opinions here given are based upon many years of observation, and an experience in treating this class of affections seldom, if ever, exceeded by any, their value must necessarily be very great, and a denial of their correctness received with hesitation.

Gonorrhœa is defined as "a catarrh of the urethral mucous membrane," and a differentiation of the disease is made into a serous, epithelial, or mucous, and a purulent gonorrhœa, although a distinction between these varieties cannot always, it is said, be strictly maintained. The serous and mucous forms are forerunning stages of the purulent catarrh of gonorrhœa, and it is thought that the disease may be arrested at any one of these stages.

While it is admitted that gonorrhœa is undeniably a disease that may be transmitted from one person to another, the views as to the nature of the infecting agent are not considered by the authors yet sufficiently clear as to positively determine what it is. The possibility of occasioning a purulent secretion in the urethra by means of mechanical, chemical, and pathological irritants is not denied, being, it is said, "a matter of daily observation;" and, indeed, Von Zeissl does not stop here, but goes further, and writes as follows: "In our practice, however, we have seen numerous instances where men troubled only with the prodromal phenomena of gonorrhœa—*i.e.*, a prickling sensation at the meatus urinarius, where not a trace of pus could be found in the urethral discharge—infected their wives and mistresses. We have likewise had the experience that the slight mucous secretion of gleet is capable of communicating a gonorrhœal disease." The conclusion reached from their experience and investigations upon this subject is "that the morbific potency of a gonorrhœal infection is not to be found in the pus-cells, but in a specific catalytic power of the secretion,—*i.e.*, in a contagion which adheres to the epithelial as well as the pus-cells, and which we are not able to isolate any more than other kinds of contagion. The hypothesis that an animal or vegetable parasite (Neisser's gonococcus) forms the basis of a gonorrhœal contagion has not yet been satisfactorily demonstrated." This view of the question we do not think is one which very materially helps us out of the difficulty. To say the agent of contagion is a "specific catalytic power" tells us nothing. The hypothesis of the gonococcus is much more satisfactory, but, unfortunately, we, with the authors, have not as yet been convinced of its etiological nature. From our own experience, and from the present state of the scientific investigations upon this subject, we are inclined to the pus infection as the genetic factor in this disease, and opposed to any theory which depends upon a specific element as a causative agent.

Prophylactic measures against gonorrhœa the authors, very properly, we think, believe are all uncertain, and they can only recommend thorough washing with water, and urination directly after copulation, as a possible preventive against infection. In regard to the abortive treatment of gonorrhœa, its accomplishment is considered beyond our present ability, and the methods which have been suggested are thought to be often positively injurious, without any beneficial result.

The treatment of gonorrhœa by the authors is such as we can fully endorse, both from its simplicity and efficacy. Local methods, by means of injection, are preferred to internal medication, but it is not to be forgotten that "most cases of gonorrhœa would get well within four or six weeks without injections or internal medication," therefore, we think, in many cases, treatment has received credit due to nature. The sections which discuss the various complications that may arise during an attack of gonorrhœa are very satisfactory, giving the symptoms, diagnosis, and treatment of these lesions in a concise and practical manner. The same may be said of the section devoted to gonorrhœa in the female.

The soft chancre or chancroid is defined as an ulcer, the origin of which is ascribed to a contagious specific matter. In regard to the nature of the specific matter, it is said, "we know no more regarding the contagious element which is capable of giving rise to soft chancre than we do of the nature of contagions in general." Here, again, we have the etiological factor being referred to a specific element; and, again, we are not willing to accept this view, since all the difficulties of believing in what we cannot demonstrate may in a great measure be removed by simply looking upon the chancroid as a non-specific ulcer, occasioned by an irritant, viz., pus. Experimental investigations and pathological lesions apparently sustain the latter

view, while, on the contrary, no investigations have, as yet, been able to show any specific organisms in etiological relation with this disease, nor is it possible to differentiate between many pathological lesions, resembling the chancroid, but of known origin, of a non-specific nature.

The plan of treatment for chancroids advised by Von Zeissl is a most excellent and efficient one, which we have most faithfully tested for the past three or four years. Its success depends upon its simplicity, and non-interference with the healing process; therefore all irritants and caustics are to be avoided, but cleanliness and protection of the lesion practised. In a word, the chancroid we think should be treated in reference to the local condition of the sore. Thus, when normal, if such a term is ever applicable to a pathological process, cleanliness and protection; when irritable and painful, soothing applications and anodynes; when indolent and stationary, stimulants, and even cauterization.

The section on "Syphilis and its Different Lesions" is a very complete outline of this disease; indeed, in many cases the term outline does not sufficiently express the scope of the work, since frequently it would be difficult to more fully describe the lesion under consideration than has been done by the authors, and where descriptions have been somewhat briefly given, we find nothing of importance has been omitted, so that for the practical physician we know of no better work for reference or study.

In regard to the nature of the virus of syphilis, Von Zeissl believes it to be a "fixed principle," which, as yet, has neither been discovered by the microscope nor chemistry. The claim to the discovery of a peculiar micro-organism in the blood and morbid lesions, which is the cause of syphilis, has not yet been confirmed in the author's opinion. The first manifestation of the presence of the syphilitic virus is said to be at the spot where it was deposited and absorbed, and the various appearances presented by the local lesion is thought to depend upon the nature of the vehicle in which the virus is contained, —*i.e.*, pus, ichor, or with some non-irritating fluid, such as blood, serum, or lymph. When the vehicle is irritating there results ulceration and suppuration; but when the fluid is of an opposite nature, and there is no deep solution of continuity at the place of infection, there occurs no suppuration or ulceration, and a rapid healing of the excoriation, the characteristic induration of the constitutional disease appearing later. The value of the auto-inoculability of an ulcer upon one affected with it is believed to be of little diagnostic importance, since pus of non-venereal origin will produce on syphilitic persons a series of inoculable ulcers. Much has been written upon the way in which the virus of syphilis gains access to the system, some claiming that the blood is the means of conveyance, others the lymph, and at the present time both have their advocates. We are in accord with Von Zeissl, who says "that the syphilitic virus is conveyed to the blood by the lymphatic vessels," and we think the course, symptoms, and history of the disease fully sustain this view. The various lesions which may result from syphilitic infection, and the different organs and structures of the body which may be attacked by the disease, are most ably described. The same may also be said of hereditary syphilis and its lesions.

The great experience of Prof. von Zeissl, and the unusual opportunities he has had in the treatment of syphilis, lead us to turn to this portion of the book with much interest, in order to learn his opinion upon this most important division of the subject. Here we find the authors are at variance with most English, American, and French syphilographers in that they do not place the same value upon the mercurial treatment of this disease, but the expectant or iodine treatment is advised. It is believed "that when mercury is employed very early—as soon as the primary lesion is detected, or the first eruption appears—the symptoms then present will, it is true, speedily disappear; but obstinate relapses are more likely to follow than when syphilis is first allowed to spend its fury." Therefore it is seen that the objection to this drug is its too early employment. Thus, it is stated "that it is not the mercury that is injurious, but the improper time chosen for employing it against syphilis." Indeed, so strongly is this opinion held by the authors, that they do not hesitate to write as follows: "Syphilitic patients who are mercurialized very early, especially before general phenomena have appeared, are oftener attacked by grave lesions of syphilis (cerebral and visceral), and they are oftener subject to relapses than those who, for a long time, were not treated at all, or first with iodine and later on with mercury." And, again, when treating of the predisposing causes of syphilis of the nervous system, "the too early use of mercury" is enumer-

ated among others. The time when mercury should be used, according to the authors, is only after the expectant and iodine methods have failed. To better understand their treatment of syphilis, we give a brief outline of the plan they advise. Thus, a patient affected with a chancre, and having no constitutional symptoms, the treatment is confined to the local lesion. When the syphilitic skin-lesions appear, either macular or papular eruptions, nothing is given, unless, at the end of eight weeks, there is no improvement, or it has not entirely disappeared, they then prescribe iodine preparations. If eight weeks more are passed, and the symptoms of the disease have not entirely disappeared, "then the treatment with mercury may be resorted to without any fear concerning the future course of the disease," The conclusions arrived at by them, in following out their plan of treatment in regard to the expectant method, are, "that constitutional syphilis will follow, even if not a particle of mercury is used, and that the assertion of anti-mercurialists, that the so-called secondary and tertiary syphilis are only the manifestations of the mercurialization, is not true. Relapses and the gravest forms of syphilis may supervene just as well after a strict and scrupulously carried out expectant plan as after an antispecific treatment. We only wish to say that these phenomena occur comparatively rarely after expectant treatment, and that the relapses are apt to occur less often than after an early mercurial treatment." And for the iodine treatment they write, "Iodine in proper quantities, in conjunction with a carefully regulated regimen, are sufficient to cause the symptoms of syphilis to disappear, or at least to be weakened, so that only a few mercurial inunctions will be necessary to complete the cure, without fear of a relapse occurring in years to come." Notwithstanding this method of treating syphilis has the endorsement of such high authorities as our authors, we fear it will not be adopted by many American physicians, who have been brought up to believe in the almost specific effect of mercury in this disease, and who, in their experience, have undoubtedly seen good results follow its employment. However, as previously remarked, the great experience and unusual opportunities of the authors to investigate this disease in all its stages make us hesitate to oppose their conclusions, and we can only say our experience in the opposite direction, viz., first mercury and later iodine, has given satisfaction. J. H. C. S.

THE JOURNAL OF COMPARATIVE MEDICINE AND SURGERY. Edited by W. A. Conklin, P.H.D.V.S., and Rush Shippen Huidekoper, M.D., Veterinarian, Alfort, and published by A. M. Hummel, M.D., 1217 Filbert Street, Philadelphia.

With the issue of the October number the management of the *Journal of Comparative Medicine and Surgery* passes into new hands. The publication office is transferred from Philadelphia to New York, and the *Journal* itself is enlarged and improved in every department. The paper and the typography are better than in its earlier issue, and the number of pages are increased and its value enhanced by the addition to the editorial corps of some of the best known and most scientific members of the medical profession. The *Journal* has assumed a more thoroughly scientific aspect than ever, utilizing, as it does, the best material from Harvard, the University of Pennsylvania, the Royal Veterinary School of Dresden, and other prominent colleges. It is the only journal published on comparative medicine and surgery, and the reputation of its editors is sufficient guarantee that this field of science will be well represented.

The October number contains a number of valuable original articles, among which we may mention "Avian Tuberculosis," by John Bland Sutton, F.R.C.S.; on "Injuries of the Beak in Birds and the Method of Repair," by R. W. Shufeldt, M.D.; the "Rôle of Microbes and their Chemical Products in the Causation of Diseases," by James Law, F.P.C.V.S.; and "Atrophic Carcinoma," by Richard W. Burke, V.S.A.V.D., and others.

ANALYSIS OF THE URINE, WITH SPECIAL REFERENCE TO THE DISEASES OF THE GENITO-URINARY ORGANS. By Hofmann and Ultzmann. Translated by T. B. Brune and H. H. Curtis. Second Edition. Appleton & Co., 1886.

The names of Hofmann and Ultzmann are so well known as those of authorities upon matters pertaining to the examination of urine and urinary disorders that the profession is ready to welcome a second edition of this very valuable treatise.

After a short introduction the writers discuss the histology of the urinary apparatus. This is treated as briefly as is consistent with the demands of the subject. The greater part of the book is devoted, as its title indicates, to the analysis of the urine and its relation to disease; and here there does not seem to be anything wanting to make it nearly complete. Qualitative examination receives careful attention, and is brought

fully up to date by the added notes of the translators. These notes—always separated by brackets from the original text—include the acetone and diacetic acid reactions; the latest methods for the recognition of levulose, lactose, peptone, propeptone, mucin, globulin, etc.; the newer tests for bile, albumen, and glucose, etc. The chemical notation is employed to explain the reactions when not too complicated.

The methods for the quantitative analysis of but a few of the constituents of the urine are given, and occupy comparatively little space. These methods are, however, reliable, and made very plain by means of illustrative examples worked out by way of explanation.

The microscopical and chemical characteristics of the urinary sediment are also ably treated, and the book is enriched by the addition of a series of lithographic plates, taken principally from the authors' atlas.

Probably the most valuable feature of the book is the attention devoted to the relation which urinary analysis bears to clinical diagnosis. Here we find, for example, a discussion of the causes which increase or diminish the elimination of urea; the different forms of renal disease producing albuminuria, and the microscopical and chemical means of determining which of these is present; the various causes of hæmaturia; the different stages of cystitis, etc. There is also a useful list of the diseases in which alterations of the urine are apt to occur.

The work is not so exhaustive as the large treatise of Neubauer and Vogel, and, while treating as thoroughly of analytical methods as some of the smaller books do, its clinical nature renders it invaluable to the practising physician. J. P. C. G.

A Laboratory Guide in Urinalysis and Toxicology. By R. A. Witthaus, A.M., M.D. New York: Wm. Wood & Co., 1886.

This little book is well suited to lie conveniently to hand upon the laboratory table. It is bound in note-book style, the backs being united at the top, and thus opening from the reader, and one side of each leaf is left blank for additional notes.

The subject-matter is arranged in a series of short numbered paragraphs, describing very briefly but quite clearly the progressive steps to be followed in an examination, the whole representing the acme of condensation. Yet even with the abbreviated words and style it is surprising how much useful matter the book contains. The beginner, and even one more advanced in urinary work, will find in it nearly all that he really needs.

The last portion is devoted to the chemical investigation of the poisons, and contains the various tests usually employed.

The little volume has a few faults. It is a pity that, although it contains volumetric methods for the phosphates and sugar, and processes requiring as great care as does the gravimetric determination of albumen, yet the volumetric methods for urea are entirely omitted, Fowler's quantitative method being the only one given. The phenyl hydracine test for sugar has also been left out, although it is now well recognized in Germany. And, however useful it may be to know the antidotes to the various poisons, their enumeration seems rather superfluous in a laboratory guide. On the whole, the book is a useful addition to our literature, and is sure to be valuable to the physician to whom time is a great consideration. J. P. C. G.

Correspondence.

ICE-WATER ENEMATA.

To the Editors of the Therapeutic Gazette:

Gentlemen:—I have just read with interest an excerpt from the *British Medical Journal* of October 30, 1886, in relation to the efficacy of ice-water enemata in the collapse occurring in diarrhœa of children, and wish to add my testimony as to its efficacy in a wider field. I first used it in a case of prolapse of the rectum in acute dysentery, curing both troubles in a short time. This was a soldier in the service in 1863. In 1868, in a case of acute hemorrhoids, with prolapse of the rectal mucous membrane from acute diarrhœa, ice-water relieved all the symptoms more rapidly than any other treatment of which I am cognizant.

Especially valuable evidence is a case of acute procidentia of the rectal mucous tissue in a case of intercurrent dysentery in a patient 2 years of age, undergoing treatment by aspiration for an acute empyema after "measles." Here the pain from the rectal trouble was threatening collapse, coupled as it was with frequent dejections, which were not relieved by opiate enemata and saline cathartics. Recourse was had to ice-water enemata after each defecation, with the most gratifying results as to pain and frequency of the discharges. The livid mucous surface, as

it became chilled, was blanched in appearance, and the procidentia, or intussusception, was restored to its normal condition without any other aid.

RALPH C. HUSE, M.D.

TOXIC EFFECTS OF TEA.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—I have read with much pleasure the remarks of Dr. Davies on "The Toxic Effects of Tea" in your last issue, and I beg leave to ask him the following questions concerning some of the propositions laid down in his paper, which may prove to be of historical as well as of scientific interest:

1. When, by whom, and by what methods were theine and caffeine found not to be physiologically and chemically identical, and where is the discovery recorded?

2. Does not the physiological action of tea and of coffee in the main correspond with that of theine and of caffeine, and, if not, where is a record of the experiments to be found?

I am sincerely yours,

THOS. J. MAYS.

November 26, 1886.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—Will you kindly settle the following question,—*i.e.*, Can we have a physiological action of *any* drug *not* preceded by a *chemical* action of said drug?

DRS. LANGSON & SCHULZ.

AURORA, NEB., December 7, 1886.

[The answer to be given to such an inquiry as the above depends very largely upon the meaning with which the terms are employed. We should say that every functional act of the living tissue is accompanied by nutritive—that is, by chemical—changes in such tissue, and therefore by chemical action. The drug that affects functional activity must check or alter the chemical movements in the affected tissue, and we should certainly say that the drug had a chemical influence. The term physiological action is used with such various significance that before any close reasoning is indulged in it must be defined. The writer often means that the physiological action of the drug is the ultimate apparent effect which it has upon the function. Thus, the physiological action of atropine is to arrest the secretion of the salivary glands. Such arrest is undoubtedly the result of primary influence exerted upon the chemical movements of protoplasm, either directly in the gland itself or through the nervous tissue which dominates the gland, and would therefore be said to be preceded by a chemical action or influence. On the other hand, the term physiological action might be used to express the primary impression produced by the drug upon the living tissue. Employed in this way, physiological action would itself be a chemical influence. We think the term is commonly employed by writers to indicate the results of the chemical influence rather than the primary influence exerted by the drug.—EDS.]

Notes and Queries.

FATAL RESULT OF PEROXIDE OF HYDROGEN INJECTIONS.

A Norwegian surgeon, DR. LAACHE, has reported a case in which a fatal result followed an injection of peroxide of hydrogen into the pleural cavity. The patient was a man 28 years of age, who had had a portion of the ninth and tenth ribs resected for empyema. The operation had been successful, and the wound progressed favorably, and two months after the operation there remained only a fistula about an inch and a half long. In order to hasten the healing of this, hypodermic injections of a three per cent. solution of peroxide of hydrogen were resorted to, as this method of treatment had given very satisfactory results in two somewhat similar cases in which it had been tried. Six injections, each containing 0.8 cubic centimetre of the solution, were administered without any particular effect. At the seventh, however, the patient complained of pain and faintness, the pulse failed, the respiration became oppressed, clonic contractions occurred in the right arm, the head turned to the left, the jaws became tightly set, the face became cyanotic, and the patient died in ten minutes. The necropsy, which was not made till forty-eight hours after death, revealed nothing very striking. The heart was dilated and contained liquid blood without air-bubbles; some ecchymoses were found in the parts of the left lung which were adherent to the chest-walls. In the fourth ventricle of the brain an ecchymosis the size of a pin's head was seen. A number of air-bubbles were present in the blood of the hepatic veins, and some were seen on cutting into

the spleen and kidneys. The cause of death was therefore by no means clear. Dr. Laache suggested that it may have been the small extravasation in the fourth ventricle or shock. Dr. Wulfsberg, who took part in the discussion on the case at the Christiania Medical Society, thought it was probably due to the introduction of the drug into the circulation. He thought that the strength of the blood-current might have carried the peroxide, if introduced into a vein, through the right heart and lungs almost unchanged, but that afterwards more oxygen might have been disengaged than the blood could absorb, and bubbles were thus produced, which may have been the immediate cause of death. Where animals have been subjected to injections of air into the veins, bubbles are not always found in the blood. In these cases Dr. Wulfsberg thinks that death has been due to paralysis of the heart, for when examinations have been made immediately after death bubbles have been found in the coronary arteries. As so long a time had elapsed before the necropsy in Dr. Laache's case, these might have been absorbed.—*Lancet*, October 9, 1886.

PILLS AND SYRUP OF SPARTEINE.

HOUDÉ recommends the following preparations:

1. Sulphate of sparteine, gr. viiss;
   Excipient q.s. to make 50 pills.
   From 2 to 10 pills daily.

2. Sulphate of sparteine, gr. v;
   Syrup of orange, f℥x.

One-half ounce of syrup contains $\frac{1}{10}$ gr. of the drug.

Germain-Sée and Laborde have shown that in doses of 1½ grs. sparteine is valuable as a heart-stimulant, indicated both when organic lesions exist and when an impeded circulation taxes the heart. Its effect upon the pulse is prompt and marked, and its use has been free from unpleasant after-effects.—*Le Monde Pharmaceutique*, November 3, 1886.

EULYLYPTOL.

"Eulylyptol" is the name given by DR. SCHMELTS to a mixture consisting of six parts of salicylic acid to one each of carbolic acid and oil of eucalyptus, which he considers preferable as an antiseptic to iodoform, corrosive sublimate, or carbolic acid. Dr. Schmelts considers that a chemical combination takes place between the ingredients, since carbolic acid cannot be detected in the mixture. It is described as having a strong aromatic odor and an acrid burning taste, and as being nearly insoluble in water, but very soluble in absolute alcohol, ether, chloroform, and a mixture of equal parts of alcohol and glycerin. It is also soluble in ammonia and alkaline solutions. According to Dr. Schmelts, it completely arrests the fermentation of all putrescible substances, a small quantity added to urine, under any condition, being sufficient to preserve it during a month.—*Pharmaceutical Journal and Transactions*, October 30, 1886.

INFANT FEEDING.

There is the greatest divergence of opinion among practical and enlightened members of our profession on this most vital subject. The poor mother, unable to suckle her infant, has not alone to face the conflicting instructions of doctor and nurse, the first clinging tenaciously to his physiological doctrines in spite of the screams of the infant and its non-increase in weight, and the second maintaining the excellence of her patent foods and of her various "thickenings," regardless of the future rickets in store for the luckless child. But when doctors disagree, and especially doctors who speak with the authority of experience, the mother's bewilderment may well be great, and she is either tempted to fall back on the time-honored rule of thumb, or take refuge in the hypothesis of compromise that the proper course lies sometimes with one, sometimes with the other, and sometimes between the two. We shall not presume to adjudicate between the diverging views of our correspondents. With the limited knowledge at present available on the subject, they seem to us alike too sweeping and dogmatic for universal acceptance. Let us attempt the humbler task of indicating some simple homely tests which ought to be applied in any given case before we conclude that the method which has been adopted in that case is a satisfactory one.

The first test depends on the quiet and comfort of the child and the increase in body-weight. This increase ought to be from three to four ounces weekly, or more. The weight test is, however, by no means conclusive if taken alone. Many a hand-fed child when twelve months old is fat and plump, but is found to be rickety to an extreme degree; and it is well known to experienced nurses that breast-fed healthy in-

fants are often much less stoút than those which are reared by hand. The advocate of any given method will not therefore settle the matter by simple weighings, although these count for a great deal.

The second test depends on the examination of the fæces. With regard to the frequency, there is a common belief that four to six is the proper number of daily evacuations for an infant during the early months of its existence. We hold this to be a mistake. Healthy breast-fed infants often pass not more than two stools a day after the first fortnight, and satisfactory hand-feeding ought to aim at a similar result. We hold that there is a presumption that an infant who passes regularly from four to six stools daily is passing a great deal of undigested food, and that so far the alimentation is imperfect. The wholesome fæces of a healthy breast-fed infant are of a bright gambogeyellow, they are not unduly offensive, and they present very scanty traces of undigested casein. Now, in the majority of infants brought up on cow's milk, even diluted to the starvation-point, the stools are distinctly offensive, and are largely made up of masses of white casein. When this occurs, to find fault with the liver and do nothing more than prescribe the inevitable gray powder appears to us the most absolute empiricism, and the antiseptic cleansing of feeding-bottles and the banishment of tubes, excellent as these measures undoubtedly are, will not solve the difficulty in question.

How can the casein be dealt with? There are several methods open to us. First, it may be predigested wholly or in part. The simplest and readiest way of accomplishing this has, in our experience, been brought about by the use of one of the preparations suggested by Sir William Roberts, which, made with fresh milk, is practically a partly-digested milk-gruel. But it is doubtful whether this method, invaluable as we believe it to be in selected cases, ought to be tried as the first routine step in dealing with the difficulty in question.

Sir William Roberts, in his lectures at the College of Physicians, referred to an observation of his own made while feeding a healthy kitten exclusively on predigested food. Without obvious or marked departure from health, the kitten, nevertheless, in respect of body-weight fell behind another kitten fed on milk. It was suggested that some atrophy of unemployed glands might be responsible indirectly for this failure in nutrition. Now, in our problem, if we can get the infantile alimentary tract to digest for itself the casein masses, more will be gained than if the casein be predigested.

A simple, time-honored method, which we think ought always to be tried, is the dilution of the milk in varying proportions with barley-water, which, perhaps, in a mechanical way, facilitates the separation of the curd into more manageable masses. If this is found unsatisfactory, a very little malted food ought, we think, to be added to each bottle. That the whole character of the stools in respect of undigested casein may become altered after the adoption of this simple expedient we have satisfied ourselves again and again, as well as of the diminution in the actual number of the evacuations. But our physiological friends protest that this is using farinaceous food, that the infant's pancreas and salivary glands are rudimentary, and that its economy is unequal to the conversion of starch. To this objection there are several answers to be made. First, physiologically, it is by no means proved that the sole agents in the conversion of starch are the pancreas and the salivary glands, and experiments to prove the absolute incapacity of the infantile alimentary tract to convert a small amount of starch are not forthcoming. Again, in a good malted food, a great part of the starch has been already converted and rendered soluble. But let it be granted that, even after boiling, there is a small amount of unaltered starch; if the net result is that the fæces of the child are more wholesome and less frequent, that it does not suffer from vomiting, acidity, and flatulence, and that it is gaining weight, what evidence is there that the small amount of starch has done harm?

The employment of the term "farinaceous" has, indeed, brought us more or less under bondage in our directions as to infant feeding. To repeated meals of arrow-root, corn-flour, baked flour, and the like, even when made with milk, the term farinaceous is properly applicable, and we are second to none in our condemnation of such methods of feeding infants; but a broad distinction ought to be drawn between them, and the use of a very small quantity of malted soluble food added to milk. If even the malted foods be used in large relative proportion in early infancy, to the exclusion or great diminution of the quantity of fresh milk, we believe that serious risk is incurred in the direction of scurvy; and this is the more insidious because, with regard to the two tests which we have men-

tioned, the body-weight may certainly increase, and the stools may be less offensive and less frequent than under a milk regimen. The proper use of the malted foods is that they should be employed in small quantity, not in any sense as a substitute for fresh milk, but as an aid to the digestion of the casein.

We have said nothing about the humanized milk and the cream and whey methods. Useful as these plans have unquestionably proved hitherto, they have been methods for the rich and not for the poor, and their discussion may be for the present deferred.—*Lancet*, November 20, 1886.

AN INTESTINAL ANTISEPTIC.

BOUCHARD, in the *Revue Internationale des Sciences Médicales*, gives the following:

℞ Naphthaline,
Sacch. pulv., aa ʒiss;
Ol. bergamot., gtt. iii. M.
Ft. pil. xxx.
Sig.—One every hour.

COMPOUND LIQUORICE POWDER.

DR. MARTIN OXLEY (*Lancet*) has ordered the following formula for some time past, in which anise fruit is substituted instead of the fennel, and one-fourth part of ginger is added. The altered formula runs thus: Senna and liquorice-root, of each 2 parts; anise fruit and sulphur, of each 1 part; sugar, 5¾ parts; ginger, ¼ part. This altered preparation is quite as satisfactory in its laxative properties, is less liable to gripe, and is as pleasant to take as the officinal powder, and he would suggest its trial in cases where the powder as now prepared produces the disagreeable effects to which he has referred.—*Boston Med. and Surg. Journ.*

TREATMENT OF GOITRE.

The injection of goitre with 5 drops of Fowler's solution twice weekly, and the daily exhibition of 5 drops of the arsenical solution and 12 grains of potassium iodide internally, is the treatment recommended by EICHBERG in *Les Nouveaux Remèdes*, November 24, 1886.

THE CAUSE OF CIRCULAR GASTRIC ULCER.

DR. SILBERMANN, of Breslau, has lately made some experiments on dogs for the purpose of showing that the kind of anæmia characterized by deficiency of hæmoglobin in the red corpuscles of the blood is peculiarly favorable to the production and maintenance of circular ulcers of the stomach. Hæmoglobinæmia was produced by injection of various substances, and then either chromate of lead was introduced into a small gastric artery, or a ligature was applied to it, or the internal surface of the stomach was abraded by means of an œsophageal sound carrying a guarded point. All these animals were found to have contracted gastric ulcers, and it appeared to make no difference whether the hæmoglobinæmia was produced before or after the stomach was injured. With the microscope it was found that a number of the red corpuscles were of a very pale color, and that the blood was less alkaline than normal, which is explained by the experiments of Preyer, A. Schmidt, and Rollet, who have shown that hæmoglobin is a weak acid. Dr. Silbermann considers that in the anæmia of hæmoglobinæmia all the conditions are present which are required by various theories for the production of gastric ulcer,—namely, arterial anæmia (Klebs), venous hyperæmia of the gastric mucosa (Key), venous stasis in the hepatic vessels (Gunsberg), circumscribed hemorrhages (Virchow), and, lastly, diminished alkalinity of the blood (Leube).—*Lancet*, October 23, 1886.

TREATMENT OF ECZEMA IN CHILDREN.

Eczema in children is very successfully treated by WIDERHOFER with a five per cent. lanolin and bismuth salve. This is thickly spread upon linen, and bandaged upon the part morning and night. Lanolin forms but a small amount of fatty acids upon the skin, while vaseline and other fats readily produce fatty acids, which to the child's sensitive skin are very irritating.—*Allg. Wiener Med. Ztg.*, No. 32, 1886.

MYTILOTOXINE.

Numerous attempts have been made to effect the isolation of the poisonous principle in mussels. M. Salkowski has extracted by means of alcohol some harmful products, at present undetermined. The action of these products, however, recalls slightly the action of curare. M. BRIEGER (*Deutsche Med. Wochensch.*) has succeeded in isolating this harmful principle, which he calls mytilotoxine, and at the same time several other bases, some

being harmless, while others are poisonous. These bases are precipitated after extraction with acidulated water or with alcohol by phosphomolybdic acid, perchloride of platinum, etc. One of the inoffensive bases appears to belong to the choline series; another, injected under the skin of small mammalia, produced salivation and profuse diarrhœa. Mytilotoxine is the most important of these bases: its composition ($C_6H_{15}NO_3$) M. Brieger has been able to determine possesses certainly the properties of curare, already recognized by Schmidtmann, Virchow, and Salkowski. A fourth basic product is precipitated by gold perchloride in the form of an oil. It is very poisonous. Animals poisoned by it remain as though rooted to the ground, and succumb after a few convulsive movements. Lastly, M. Brieger points out a body with a detestable smell, recalling that of cacodyl. The greater part of these compounds appear to belong to the class of the ptomaines, and this specific principle disappears on distillation with carbonate of sodium, a fact announced by Salkowski. From this observation the following practical result arises: that decoctions of mussels may be rendered inactive by the addition of a little carbonate of sodium (three grammes to three and one-half grammes per litre of water), but the alkaline salt must be added while the mussel solution is boiling; in the cold solution it is inert, and is not, therefore, a true antidote. The action upon the muscles themselves is identical; boiling carbonate of sodium renders them harmless, at least to a certain extent.—*Druggists' Circular*, November, 1886.

A CURE FOR WARTS.

Take 15 grains of corrosive sublimate and dissolve in 1 ounce of collodion. Brush the warts carefully once a day with this solution. This remedy is more efficacious and more convenient than other recommended procedures.—*Zeitschrift d. Oester. Apotheker-V.*, September 20, 1886.

BINOXIDE OF MANGANESE IN AMENORRHŒA.

The effects of manganese in stimulating the menstrual flow, when its suspension is not due to pregnancy, have been fairly established by trials extending over nearly eighteen months. In the articles contributed to the medical journals on the subject, at the beginning of last year, the permanganate and the binoxide were both mentioned as possessing emmenagogue properties; but experiments have so far been made almost exclusively with the permanganate. In consequence, however, of certain disadvantages which are apt to attend the administration of this salt, unless several conditions are complied with, aided, perhaps, by theoretical notions as to the transformation which so unstable a body may undergo immediately after being swallowed, the binoxide, which is equally potent and less irritating, has latterly come into favor. Manganic dioxide, it is true, has been described as possessing no therapeutical value; but it is conceivable that if its effects are limited, even approximately, to the menstrual function, they may have escaped the attention of observers, especially if, as is not improbable, their investigations were confined to men or animals.—*Brit. Med. Journ.*, December 4, 1886.

HOW TO PRESCRIBE HYOSCINE.

CLAUSSEN, in the *Zeitschrift für Therapie*, September 1, 1886, recommends the following formulas for the hypodermic and internal employment of hyoscine in asthma, whooping-cough, neuralgia, epilepsy, and paralysis agitans:

℞ Hyoscini hydrobromici s. hydroiodici, gr. $\frac{1}{15}$;
Solve in aqua destillata, f℥iiss.
S.—$\frac{1}{3}$ to 1 syringeful for subcutaneous injection.

℞ Hyoscini hydrobrom. s. hydroiod., gr. $\frac{1}{6}$ to $\frac{1}{4}$;
Aq. dest., f℥iiss;
Syr. cort. aurant., f℥i. M.
S.—Take a teaspoonful once or twice a day.

TAPIOCA-ROOT AS AN ANTISEPTIC.

A remarkable substance, which is possessed of powerful antiseptic properties, has been extracted by Dr. Peckolt from the roots of the tapioca-plant. To this the name of sepsicolytin, or fermentation-hinderer, has been given. A very small quantity, mixed with fresh albumen, is said to preserve it for upward of six months without deterioration. As this principle is in all probability present to a considerable extent in the well-known "cassareep" of the West Indies, it is obviously not poisonous. The possibilities of use for an antiseptic free from injurious action on the system are very great, both from a culinary and medical point of view. Its action on putrid fevers, and in all diseases in which albuminous changes take place rapidly, seems worthy of investigation.—*Provincial Medical Journal*, November 1, 1886.